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The major purpose of the study was to determine the relative effectiveness of large and small group instruction at the college level. Closely related purposes were to improve large group teaching procedures so that the claimed advantages of small group instruction could be realized in large group teaching to the greatest extent possible, to study and improve facilities, including television, and to develop and encourage the use of a more adequate instructional aids center for the improvement of college teaching.

The courses investigated were taught under "experimental" conditions and under "control" conditions. The experimental conditions generally involved some variant of "large group" instruction, with sections arranged in various ways to permit a single instructor to extend his influence as a teacher to a greater number of students than in the teaching of small classes. The control condition consisted of course sections which were "conventional" or "typical" in size for the University. A section was considered "large" by definition if the instructor was responsible for at least twice the number of students ordinarily taught by him in a conventional section.

Evaluation of instructional methods and facilities showed that college teachers involved in the study gave every evidence of being keenly interested in improving their course organization and their instructional procedure. Evaluation of student achievement showed that with few exceptions, large group instruction was as effective as was small group instruction. Student attitudes about large group instruction revealed that students in the TV and in the large non-televised sections tended, in general, to rate the course content somewhat less favorably than did students in the control sections of these same courses. Faculty reaction to large group instruction showed that practically all instructors who had tried TV teaching liked it better than they thought they would.

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EXPERIMENTAL STUDY IN INSTRUCTIONAL PROCEDURES

MIAMI UNIVERSITY

Under Grant from the Fund for the Advancement of Education

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James D. Finn

FINAL REPORT
OF THE
EXPERIMENTAL STUDY
IN
INSTRUCTIONAL PROCEDURES

For the Staff and Faculty by

F. Glenn Macomber, *Dean*
Division of Educational Services

and

Laurence Siegel, *Director*
Institutional Research Service

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January 1960

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Oxford, Ohio

INSTRUCTIONAL TECHNOLOGY - U.S.C.

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The total number of persons who participated in this Experimental Study in Instructional Procedures was such that a listing of names would seem almost like a directory of staff and faculty of the University. The time and effort expended by each participating department and individual faculty member was great and cooperation was full and freely given, often over and beyond the call of duty.

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INSTRUCTIONAL TECHNOLOGY - U.S.C.

Chapter I: Summary of Findings and Conclusions

THIS CHAPTER contains an overview of the major findings and conclusions derived from the Experimental Study in Instructional Procedures since its inception in November, 1955. These conclusions are, for the most part, predicated upon the substantial amount of empirical evidence presented in the ensuing chapters. Some of the conclusions are, however, based upon observation and experience rather than upon research data because of the nature of the situations from which they were developed. Persons unfamiliar with the scope and purposes of the Study will find it helpful to read Chapters II and III prior to reading this summary.

INSTRUCTIONAL METHODS AND FACILITIES

1. College teachers involved in the Study gave every evidence of being keenly interested in improving their course organization and their instructional procedures. Summer workshops and seminars conducted during the Study to improve methods, organization and evaluation were well attended and productive. Staff members and departmental chairmen were very appreciative of the opportunity to work individually and in groups during the summer, studying ways and means of increasing the effectiveness of their course offerings and in improving their evaluative procedures. This was done on a partial pay basis, and it is believed that both instructor and the University benefited professionally from this practice. It is seldom during the regular year that members of the instructional staff of a college can work undisturbed on instructional problems for several consecutive days. Consultant help during the period of the Study was in demand and used effectively.

2. College professors, with many notable exceptions, make inadequate use of audio-visual aids to instruction. Much of this failure can be charged to the inadequacies of audio-visual services on college campuses; much is due to lack of "know-how" in securing and using instructional aids. The use of audio-visual materials and equipment increased greatly when these were made readily available and technical assistance was provided for instructors unfamiliar with the use of overhead projectors, tape recorders, microprojectors and other aids to teaching. The addition of services for the production of "graphics" produced a startling increase in requests for maps, graphs, charts and for transparencies for the overhead projector.

3. Television is an effective means of communication for instructional purposes. The costs for purchase and maintenance of equipment and for course production are high; consequently TV teaching is not economical except as a mass medium. In general the cost factor makes televised teaching feasible only for courses of fairly large enrollment. Costs are quite variable, depending upon such factors as the kind and type of studio equipment purchased, open- or closed-circuit instruction, and the salaries and load credit for professional and technical personnel involved in course production. The "break even" point for this university is between 250 and 300 students enrolled in a given course at a given time. The ultimate use of video tape will, of course, materially affect the problem of optimal enrollments. It will increase the original cost of a lesson production considerably, but will make repeat performances possible at greatly decreased costs. The use of tape will add a very desirable degree of flexibility in scheduling courses and, consequently, add greatly to the utility of television as a medium of instruction.

4. Possibly the greatest handicap to large group teaching other than the lecture method is, on most campuses, the lack of rooms planned to facilitate those procedures which are dependent upon class discussion. The lack of rooms designed for TV reception is of equal concern. The conventional classroom with its bank of windows along one side, its overhead direct lights, and generally poor acoustical properties makes a very inadequate TV receiving room. Poor seating arrangement for TV viewing, the difficulty of eliminating receiving set glare, poor acoustics, and, generally poor ventilation when shades must be used, puts TV teaching at a great disadvantage over the small group instruction for which the rooms were designed.

The conventional rectangular room, even though of sufficient size to accommodate 60 to 80 students, normally discourages anything but a lecture, or, at the best, an "interrupted lecture" as the basic teaching procedure. Auditoriums, while often excellent in acoustical properties and in ventilation, are not at all conducive to the development of class discussion.

The best type of room observed during this Study was that developed at Harvard University in the Graduate School of Business Administration and at the University of Western Ontario for case study teaching procedures with groups of from 70 to 110 students in a class. These rooms, with their "U-shaped" seating arrangement, with high quality swivel seats which enable each student to face a speaker in any part of the room, with their excellent acoustics and air conditioning, with adequate provision for the use of visuals, and with a raised platform arrangement progressing from front to rear, operate to encourage discussion. With minor modifications they would be excellent TV receiving rooms.

5. Another serious handicap to televised teaching is the lack of receiving sets of adequate screen size and of picture quality needed for class viewing. This is a technical problem which is being increasingly recognized by manufacturers of receiving sets, and as the demand increases, it is expected that special classroom receivers can and will be designed especially for this market. The average commercial receiver, designed as it is for the home receiver market, is inadequate for instructional use, even when provided with special control and safety gadgets. Research is needed to better identify classroom needs so that TV receivers may be developed especially to meet these needs.

STUDENT ACHIEVEMENT

1. Studies of subject-matter achievement as a function of section assignment involved comparisons of the scores earned on the objective portions of the final examinations by equated groups of students attending experimental and control sections. It was

apparent that, with few exceptions, large group instruction (including TV) was as effective as was small group (conventional) instruction. The unique instances wherein students in the experimental sections achieved either significantly more or significantly less than the students in the control sections are probably attributable to specific features related to the course content or the instructor's technique rather than to large group instruction *per se.*

The achievement test comparisons between undergraduates receiving instruction from graduate student assistants and those receiving instruction from regular faculty members did not exhibit a consistent pattern. The course content and the teaching ability of the specific assistants and faculty members involved in these comparisons appeared to influence achievement to a greater extent than did the simple factor of section assignment.

2. Achievement defined as the ability to solve problems and to synthesize information was investigated in a number of large (including TV) classes and equated control sections. The results support the general conclusion that the experimental procedures did not lead to reduced proficiency in these areas.

3. Comparative performance by students in experimental and control sections on tests measuring changes in stereotypes and misconceptions from beginning to end of the year was investigated in one TV class and three large, non-televised classes. Stereotypes and misconceptions were overcome about equally by students in the experimental and control sections of these four courses.

4. The interaction between section assignment and level of academic ability as joint determinants of student achievement was investigated in a widespread sampling of the courses included in the Study. The evidence obtained did *not* support a differential level of achievement for high ability students in the experimental and control sections of these courses. Similarly, low ability students achieved as well regardless of their assignment to the experimental or to the control sections of these courses.

5. A study designed to reveal differential effects, if any existed, of instruction in experimental and control sections upon long-term retention was conducted for nine courses. Subject matter retention after periods ranging from one to two years was clearly unaffected by increased class size or by instructional procedure.

STUDENT ATTITUDES ABOUT LARGE GROUP INSTRUCTION

1. Students in the TV and in the large non-televised sections tended, in general, to rate the course content somewhat less favorably than did students in the control sections of these same courses. Exceptions to this generalization were relatively infrequent.

A similar generalization cannot be applied to the comparative course ratings given by undergraduates receiving instruction from graduate student assistants and by regular faculty members.

2. Student motivation and interest in the specific subject-matter was *not* adversely affected by assignment to experimental rather than to control sections. Objections to large class and TV instruction which are founded upon a presumed superiority of conventional instruction for evoking student motivation and interest seem, within the scope of this investigation, to be groundless.

3. According to student opinions, the experimental procedures tended, with few exceptions, to reduce the instructor's effectiveness. This perceived reduction in teaching effectiveness was not, it must be remembered, paralleled by a corresponding decrement in actual achievement of students in the experimental sections.

4. Students in most courses preferred small classes to both large classes and TV classes. Although it has been found possible to teach a TV course in such a way that students actually perfer it to conventional instruction, this accomplishment requires a unique combination of instructor, course material and the full use of television as an instructional medium. This combination proved rare, however.

5. There is some indication that TV instruction was more acceptable to low ability students than to high ability students in those courses wherein visuals of various kinds comprised a significant portion of the presentations. As a general rule, however, high and low ability students held essentially the same attitudes toward large group instruction in comparison with conventional instruction.

6. During the initial years of the Study, evidence was accumulated indicating that students in the TV courses tended to become progressively disenchanted with television as a means of instruction as the year progressed. Most students reported that they neither learned as much nor were as attentive during the TV presentations as they had originally anticipated. Furthermore, more students were inclined to favor conventional instruction over TV instruction at the end of the second semester of full year courses than at the end of the first semester. Evidence accumulated during the final year of the Study, however, indicates that progressive disenchantment is no longer an operant factor on the Miami University campus. The novelty of televised instruction has ended and it is probable that students in such courses no longer approach them with unrealistically high anticipations.

Progressive disenchantment was never a factor operating in large non-televised classes. Students in such classes held essentially the same opinions about large group instruction at the end of the courses as they did at the beginning of the course.

7. The instructor is, himself, a major determinant of student attitudes about TV and large class instruction. There was a pronounced tendency for students to react either favorably or unfavorably to both their instructor and large class procedures. The majority of students consistently indicated that they would enroll in a TV class or a large class (even though they preferred small classes) if they would be assured thereby of being taught by an excellent teacher.

8. A pilot study of the relationship between certain measured personality variables and student attitudes toward TV and large class instruction produced negative results.

9. Students in the TV courses were sensitive to and reflected the attitudes of the assistant instructors responsible for managing the receiving rooms. Assistant instructors who were themselves relatively favorable to televised instruction tended to have sections wherein the students held relatively favorable attitudes toward TV in comparison with conventional instruction. The relationship between the attitudes of assistant instructors and the attitudes of the students in their receiving rooms was stronger during the first semester than during the second semester of the year sequence.

10. Student attitudes about large group instruction were not major determinants of their subject matter achievement. Apparently motivation

from a variety of sources is generally sufficient to overcome any negative reactions students may have to receiving large group rather than conventional instruction.

FACULTY REACTION TO LARGE GROUP INSTRUCTION

1. Practically all instructors who have tried TV teaching like it better than they thought they would. Although most would still prefer to teach conventional classes, there was considerable feeling that TV classes are superior to other large group teaching procedures. The major defects inherent in TV, as far as the instructors were concerned, are related to the physical barrier between student and teacher and the lengthy preparation time required for each TV presentation. Teaching on TV does offer certain compensatory satisfactions which may be sufficient to provide "psychic income" for a number of instructors. There is a core of teachers, however, who probably could never be so compensated for transfer from the classroom to the TV studio.

2. The reactions to TV of faculty members who have not tried TV teaching is probably best described as "moderately favorable." About one-third of this group believed that televised instruction has a definite place on the campus for course-work. Another third felt that TV should be used primarily for off-campus instruction and for supplemental work on the campus. The remaining third felt either that televised instruction should be abandoned (11%) or were uncertain about its place in the University setting (15%).

The reactions of these faculty members to actually teaching a TV course in the future were also trichotomous. Approximately a third of the sample was willing to teach such a course, a third was unwilling and a third was undecided.

3. Anecdotal evidence supported the existence of a substantial threat component inherent in TV instruction. These fears vary both in extent and in intensity. They include concerns about the possibilities of technological unemployment, inadequate royalty arrangements, and the promulgation of a "star" or "master-teacher" system. In addition, several faculty members suggested that TV may have the effect of actually changing course contents as a result of the high degree of visibility of the presentations and possible misinterpretations by casual viewers, and of changing the role and status of the teaching profession.

4. A study of load practices for TV teachers on a number of different campuses indicated that current administrative practice did not, as a rule, permit sufficient reduction in load for such teachers. The evidence accumulated indicated that each closed-circuit TV course should be weighted as the equivalent of approximately two-and-a-half conventional classes, whereas each open-circuit TV course with off-campus enrollment should be weighted as the equivalent of about four conventional classes.

5. The reactions of faculty members to large class non-televised instruction paralleled their reactions to TV instruction but were not expressed with the same intensity. Preparation time for large classes is not as disproportionately lengthy as it is for TV classes and the physical barrier between student and teacher is not as severe as it is in TV classes. Thus, although large group instruction is perceived as less desirable than conventional instruction, it is preferable to TV instruction in the opinion of most faculty members who have not taught on television.

It is interesting to note that this preferential sequence was reversed for those instructors who have actually taught on TV. They also tend to prefer conventional instruction to TV instruction, but generally expressed a preference for TV teaching over large class non-televised teaching.

Chapter II: Purpose of the Study

The major purpose of this Study was to determine the relative effectiveness of large and small group instruction at the college level. Closely related purposes were (1) to improve large group teaching procedures so that the claimed advantages of small group instruction could be realized in large group teaching to the greatest extent possible; (2) to study and improve facilities, including television, utilized in large group instruction; and (3) to develop and encourage the use of a more adequate instructional aids center for the improvement of college teaching.

Serious effort was made to use the best teaching procedures possible for each of the several courses in the Study. Procedures which seemed best fitted to small classes were utilized in the control groups, while in the large experimental groups, new procedures were developed or old ones modified to meet the particular needs and peculiarities of the large groups. In the televised classes, for example, procedures and materials were specifically devised to take advantage of the strengths of this medium and to offset some of its major weaknesses. In sections in which graduate assistants were used as teachers, the instructor in charge held seminars in "teaching methods" and supervised the work of the graduate assistants in order to insure the quality of instruction. Also, these graduate assistants were encouraged to enroll in a two-credit-hour *Seminar in College Teaching* developed to improve the quality of their instruction.

It was the intent of the Study to gain accurate information on the effectiveness of both large and small group instruction and of different teaching procedures and course organizations, rather than to substantiate any preconceived notions about methods of instruction or forms of class organization. It seemed obvious that evaluation had to be an integral part of the Study from beginning to end. Only by developing a thorough evaluative scheme could we know whether or not class size could be increased without a sacrifice of student learning. To this end an evaluational section was incorporated into the Study at its inception.

NEED FOR THE STUDY

Too well known to require documentation in this report is the fact that college enrollments are increasing rapidly and will continue to increase at an alarming rate unless curtailed either by a major war or by the imposition of severe entrance requirements. Along with this fact are two closely related conditions. First, there is every indication of a shortage of well qualified college teachers in most subject areas of the curriculum, and of very serious shortages in some. Second, it is very doubtful if the procurement of additional revenues for the operation and maintenance of our institutions of higher education will keep pace with growing enrollments. Certainly, the financial support of state supported institutions of higher education normally lags well behind increases in the size of student bodies.

This situation would not be too serious if we were facing merely an enrollment surge which would either level off or decrease within a few years. But we are actually entering a period of rapid and continuous growth of student enrollments, and there is little likelihood that this growth will be slowed down materially, particularly in state supported institutions. Facing this fact, many college administrators favor raising college entrance requirements so that the quality of the student body will be improved greatly and the flood thereby held in check. Only a few hardy souls, however, seriously believe that a highly selective admissions program will prove popular with state legislators, many of whom have sons and daughters who would thereby be barred. Furthermore, legislators have constituents who pay taxes to support higher education and who feel strongly that their children are entitled at least to "have a try" at education beyond the high school. Finally, many educators and laymen are convinced that all youth who desire it are entitled to some form of technical, professional or liberal education beyond that provided by the high schools of today. They further believe that if this higher education cannot be provided by the present colleges and universities, it should be provided by the establishment of junior or community colleges strategically located throughout each state, and, if necessary, by adding to the state university system.

It is not the purpose of this report to argue the pros and cons of the issue of restrictive admission, but merely to describe the situation as it seems to be, and to consider its implications for large group teaching. This study was justified on purely professional grounds irrespective of student population growth. Most of the practices with which the study has been concerned are rather common at the college level, yet few carefully derived data were available upon which to base conclusions about the relative effectiveness of large and small group instructional procedures. A well devised study, operating on a large scale and attempting to achieve an evaluation of the so-called "intangibles," was long over-due.

A study of this nature, however, is now of much more than purely academic interest. Whether we like it or not, public colleges and universities almost certainly will be forced into receiving and instructing larger and larger numbers of students without corresponding yearly increases in financial support and facilities. This condition, in the face of a growing shortage of "good" teachers, will force the lowering of the quality of instruction and act as a damper on the improvement of salaries unless ways can be found for increasing the ratio of students to teachers without seriously compromising instructional standards. We must not only know whether there are serious losses in student learning in large as compared to small group instruction, but we must also learn ways in which large groups can be instructed with increased effectiveness. Some data were available which indicated that there was little, if any, significant difference in achievement between small and large groups taught by the same instructor. These data, however, were obtained mostly from small samples of students and the single criterion of performance on subject-matter tests. In addition, at the beginning of this Study some rather significant data were becoming available from other studies of televised instruction.

Defenders of small group instruction have contended, however, that the really serious loss in large group instruction is primarily in the more intangible objectives. Among these "intangibles" are critical thinking, the ability to carry on independent investigation, the ability to organize one's thinking and to express himself well orally and in writing, and the development of an increased interest in the particular subject area which will carry beyond the period of formal education. It was hoped that this Study would make some significant contributions to a better understanding of this problem of "intangibles" in college level instruction.

FINANCIAL SUPPORT FOR THE STUDY

The proposed Study was first given consideration by the Council of Deans of Miami University during the summer of 1955. A plan for the Study, together with a proposed budget, was submitted to the Fund for the Advancement of Education on September 6, 1955. The request was approved on November 1, 1955, together with a grant in the amount of $135,600 to assist in financing the Study for the period of November 1, 1955, to June 30, 1957. An additional grant of $150,000 was received under effective date of July 1, 1957, to enable the continuation of the Experimental Study in Instructional Procedures for an additional two years ending June 30, 1959.

SCOPE OF THE STUDY

Though the first semester of the Study was conceived primarily as a time of preparation and "try-out," experimentation was conducted on a fairly large scale, with every effort being made to equate experimental and control sections and to develop and use valid and reliable measures of achievement and student opinion. During the period of November 1, 1955, to February 1, 1956, major additions were made to the Audio-Visual Service in both personnel and facilities; a television studio was constructed and equipment selected, purchased and installed; television crews and instructors were given minimal training; courses were selected for the Study and instructors briefed; and a beginning was made in the development of evaluative instruments. The departments and courses involved in the study from February 1, 1955, to June 30, 1959, are shown in Table 1 together with the numbers of participating students.

TABLE 1

Courses Included in the Study

TV COURSES

Course Title	Feb.-June 1956				1956-1957				1957-1958				1958-1959			
	Expt'l.		Control		Expt'l.		Control		Expt'l.		Control		Expt'l.		Control	
	No. Sec.	No. Stud.	No. Sec.	No. Stud	No. Sec.	No. Stud.	No. Sec.	No. Stud	No. Sec.	No. Stud.	No. Sec.	No. Stud	No. Sec.	No. Stud.	No. Sec.	No. Stud
Foundations of Human Behavior	1	103	2	74	1	192	1	32	1	195	1	35	1	205	1	42
Principles of Human Physiology	1	96	1	31	1	198	1	33	1	228			1	175		
Introductory Sociology	1	141	4	144												
Human Biology	1	183	1	178												
Air Science I					1	154	1	35	1	119	1	20				
Principles of Economics					1	175	1	30								
Principles of Animal Biology									1	155	1	84	1	175		
American Government													1	61	1	78
LC COURSES																
Business and Government	1	119	1	35	1	125	1	35	2	199						
Composition and Literature	4	200	4	100	4	224	4	106	4	182	4	113	2	83	2	55
Essentials of Geography	3	213	3	93	3	225	3	105	2	232	1	29	1	103	1	24
Elementary Psychology	1	78	1	30	1	98	1	30	1	122	1	34				
General Chemistry					1	225	1	20	1	207	1	29				
Classical Humanities					2	132	2	60								
Principles of Economics					1	175	2	65								
Teaching Principles and Practices (Elem.)					1	50	1	25								
Teaching Principles and Practices (Sec.)					1	60	1	25								
Beginning French					1	46	1	25								
Second-Year French									1	48	1	27				
International Politics					1	60	1	30								
College Algebra					2	120	2	60								
Marketing Policy					1	60	1	30	1	40	1	24	1	30	1	18
Introductory Physics					2	92	4	80								
Essentials of Western Culture					2	170	2	70	1	80	2	64	1	104	2	60
Introductory Sociology					1	75	2	60								
Principles of Animal Biology					4	680	1	64								
American Government									1	70	1	28				
Accelerated Composition and Literature													2	92	2	56
INDEPENDENT STUDY																
Growth of American Civilization													1	26	2	68
International Politics									1	31	1	27				
GS COURSES																
Principles of Business	16	400	1	25	11	330	6	180	16	441	1	31	15	380	2	54
General Geology	5	120	1	21	5	150	1	30	6	212	1	39	7	264	1	23
Composition and Literature													4	109	2	55

Chapter III: Experimental Design

In line with the major purpose of the Study, the emphasis in research was placed upon studies of the comparative effectiveness of large and small group teaching. The present chapter includes descriptions of the teaching procedures employed, the evaluative criteria utilized, and the specific hypotheses or questions which were investigated.

TEACHING PROCEDURES

The courses investigated by the Study were taught under "experimental" conditions and under "control" conditions. The experimental conditions generally involved some variant of "large group" instruction, with sections arranged in various ways to permit a single instructor to extend his influence as a teacher to a greater number of students than in the teaching of small classes. The control condition consisted of course sections which were "conventional" or "typical" in size for Miami University. A section was considered "large" by definition if the instructor was responsible for at least twice the number of students ordinarily taught by him in a conventional section. Since the typical enrollment in a conventional course section at Miami University does not exceed 25-35 students, sections which enrolled in excess of 50 students were usually designated as "large." As a general rule, however, sections classed as "large" had enrollments in excess of 80 students.

THE EXPERIMENTAL SECTIONS

Four different types of large group procedures were investigated within the framework of the Study. These are identified as:

1. Sections taught by closed-circuit television. These are hereafter designated simply as *TV* courses.
2. Large sections in which the instructor was physically present in the room. These include courses taught by means of some variant of the lecture or interrupted-lecture method and courses taught by the case or problem procedure. These are referred to later as *LC* (large class) sections.
3. Independent study *(IS)* sections wherein the number of scheduled formal class meetings was reduced below the usual requirement of one meeting per week for each hour of credit.
4. Sections taught by graduate student assistants *(GS)*.

Instructors within each classification were encouraged to devise procedures and materials best fitted to the sections taught. The experimental and control sections of a particular course pursued the same objectives, covered essentially the same subject-matter, and took the same examinations. The procedures, however, differed to the extent considered desirable by the instructor. This fact is well illustrated by TV courses in which special procedures and materials were developed so that the strengths of television could be utilized and some of its weaknesses overcome. At the same time control sections of these courses made considerable use of discussion, a procedure which does not lend itself well to televised teaching. As an additional illustration, the control and experimental sections in *Composition and Literature* utilized much the same procedure, except that students in the large experimental classes wrote only half as many themes during a semester as did the students in the control sections.

Furthermore, no attempt was made to hold all experimental courses of a given classification to a similar procedure. The TV course, *Foundations of Human Behavior*, for example, met for two periods weekly for one and one-half hours each, with TV presentations taking up approximately 50 minutes of each day, and with approximately 30 minutes allowed for discussions under the leadership of graduate teaching assistants. Freshman *Air Science*, a two-credit-hour course, consisted of two 50-minute TV presentations weekly, with no discussion periods provided. The courses in zoology and physiology each consisted of three 50-minute periods of TV instruction and two hours of laboratory instruction each week.

Similar differences were observed among other courses of a given classification. *Marketing*, an LC course, was taught by the "case method," but *Principles of Economics*, another LC class, was taught primarily by means of lecture interspersed with discussion.

Independent study (IS) is not necessarily a large group procedure. The reduction in the number of formal class contact hours, however, frees the instructor for consultation with an increased number of individual students. Only two courses were attempted in their entirety as IS sections, *International Politics* and *Growth of American Civilization*.

Instruction by graduate assistants (GS) is a variety of large group procedure from an administrative standpoint, if not from the students'. Each section was of conventional size. A large number of such sections, however, were supervised by a single faculty member. He exerted an indirect influence upon the conduct of the course by supervising the content, organization and examinations. Two courses were included in this phase of the Study, *Principles of Modern Business* and *General Geology*. In addition, several sections of *Composition and Literature* taught by graduate student assistants were included in the Study during the 1958-1959 academic year.

THE CONTROL SECTIONS

The control sections for the TV, LC and IS courses were conventional classes consisting of 25-35 students. These sections were taught by the same instructors responsible for the experimental sections of a particular course. Thus, the basic type of comparison of student achievement and attitude was a comparison between criterion scores obtained under experimental and conventional conditions.

A number of the courses in which investigations were conducted were taught by several different instructors, each responsible for one or more experimental sections and one or more control sections. Data for *Composition and Literature*, for example, usually were obtained from three or four instructors, each of whom taught a LC section and a control section.

Occasional comparisons were made between two large sections rather than between a large and a small section. This type of comparison did not depart from the more typical control group design in any way, except for the fact that two varieties of large group instruction were compared to each other rather than to conventional small group instruction.

The control sections for the GS phase of the Study were comparable in size to the experimental sections, but were taught by full-time faculty members rather than by graduate student assistants. The basic comparison here involved was the attainment of course objectives by students attending sections taught by graduate assistants and by students attending sections conducted by regular faculty members.

MATCHING PROCEDURES

Since many of the analyses required comparisons between data obtained from experimental and control sections, it is apparent that proper interpretations of findings presuppose the existence of equated sections within each course. The variables employed for matching in all courses included the Cooperative Test of English Achievement, Cooperative Mathematics Placement Test and the American Council on Education Examination for College Freshmen (ACE). These three tests are routinely administered to incoming freshmen at Miami University. In addition a brief pretest of subject-matter knowledge was administered in a number of courses, and the experimental and control sections of virtually all courses were demonstrated to be equated with respect to proportional distributions by sex and class standing.

Since the equating process was completed after registration, the experimental and control groups represent samples of the total course enrollments. Thus, the sizes of the experimental and control groups employed for the analyses are somewhat smaller than the actual enrollments in these sections. It is important to note that neither the instructors nor the students were aware of the identity of those persons who, though enrolled in a course, were excluded from the sample under investigation. Furthermore, the *matching and accompanying decisions about constituency of the samples was effected prior to the collection of data on achievement and attitudes.*

Most of the courses included in the Study were full year courses. The matching procedures employed during the second semester were identical to those employed at the beginning of the academic year, with one additional feature. Students included in an experimental or control sample during the second semester were all included in the same sample during the first semester. In order to be considered for inclusion in the TV sample of a course for the second semester, for example, a student must have been a part of the TV sample of this course for the first semester. This requirement insured the demonstration of the effects of assignment to an experimental section for a full year. Furthermore, it eliminated a potential source of data confusion resulting from students switching sections in mid-semester.

Although the matching procedure as described was feasible for most comparisons, occasional circumstances precluding the use of equated groups did occur. In such instances, statistical controls were exerted by means of analyses of covariance.

EVALUATIVE INSTRUMENTS

The evaluative design of the Study required that criterion measures be developed in the areas of student achievement, student attitudes and opinions, and faculty attitudes and opinions.

MEASURES OF STUDENT ACHIEVEMENT

The development of a criterion of student achievement is not simple. Two separate instructors teaching the same course often vary in objectives sought. Consequently, wherever course objectives were not explicit, departments were urged to develop them. The diversity of course objectives from course to course necessitated utilization of a variety of approaches for evaluating achievement.

Course Examinations—Examinations administered for the purpose of grade-assignment are generally conceded to be an important criterion of student achievement even though they are often subject to adverse criticism. The course examination most often employed as an evaluative criterion for the Study was the final examination administered at the end of each semester. This criterion was generally designed to measure one fundamental kind of achievement: *i.e.* immediate recall of basic facts and statements of principle. Estimates of the reliabilities of these tests (Kuder Richardson Formula 21) generally ranged between .85 and .95.

Without belittling the importance of immediate factual recall as an outcome of instruction, it is apparent that final examinations are not entirely satisfactory as a criterion of achievement. Education in general, and higher education in particular, should require the student to do more than simply regurgitate an undigested compendium of facts and memorized statements of principle. We should hope that the knowledge acquired becomes part and parcel of his intellectual fabric. Thus we anticipate that the "educated" man has developed certain attitudes and appreciations, and is able to organize and utilize his knowledge in new ways. The student, in short, cannot be likened to a sponge that soaks up information which he releases in unaltered form upon the application of appropriate pressure. And the instructor's prime function extends beyond the mere strewing of puddles that must be sponged!

Thus the final examinations were supplemented by criteria of student achievement designed to measure educational objectives other than immediate recall.

Synthesis, Problem Solving and Critical Thinking—These measures were designed to evaluate the student's ability to use the basic facts and principles learned in the course. The ability simply to recall this information did not contribute substantially to the score on these tests.

A brief description of these measures is given below. The first three tests listed were products of the Cooperative Study of Evaluation in General Education conducted under the auspices of the American Council on Education and directed by Dr. Paul L. Dressel. The remaining tests were developed by instructors at Miami University.

a. *Test of Critical Thinking in Social Science:* A multiple-choice test ". . . designed to measure students' ability to demonstrate several skills involved in critical thinking within the context of the social sciences." (Administered at the end of the year.)

b. *Test of Science Reasoning and Understanding—Natural Sciences—Form C:* A multiple-choice test ". . . designed to measure students' ability to read and interpret scientific material written in popular style, and to apply scientific information to new situations." (Administered at the end of the year.)

c. *Test of Science Reasoning and Understanding—Biological Sciences—Form A:* Comparable in nature to Form C described above, except that the content is restricted to the biological sciences. (Administered at the end of the year.)

d. *Case Study Examinations in Marketing:* Three essay examinations administered at approximately four week intervals starting at mid-semester. Each examination consisted of a presentation of a 1 and ½ to 2 page mimeographed case or problem in marketing. Students were directed to solve the problem in the capacity of a consultant. They were cautioned not to write a statement of the case, pertinent facts, etc., as such. They were, rather, to discuss only the arguments, reasoning and analysis necessary to support their recommendations.

e. *Case Study Examination in Business and Government:* An essay examination consisting of two legal cases involving an appeal to the Supreme Court. Students were required to state the issue (or issues)and to decide the case, citing the Constitution and rules of law from other cases to support their decision. (Administered near the end of the course and replicated in two sections.)

f. *Synthesis in Sociology:* An essay examination consisting of three selections. The directions to students read as follows: "In this examination you will have an opportunity to apply the sociological approach and sociological principles to three concrete situations . . . State applicable generalizations. Suggest hypotheses which are related to these generalizations . . . A 'common sense' analysis such as you would have been able to write prior to taking the course will receive no credit." (Administered at the end of the year.)

g. *Synthesis in Economics:* Three essay examinations consisting of questions designed to measure the ability of students to integrate materials learned in the course. These were administered in the middle of the first semester, at the end of the first semester and at the close of the second semester.

h. *Themes for Composition and Literature:* Students were required to write four themes each year for experimental purposes: one at the beginning of each semester (pretest) and one at the end of each semester (posttest). The pretest and posttest themes each semester were written on identical topics. Papers were coded so graders could not ascertain whether any given theme was written as a pretest or as a posttest. Each theme was scored for mechanics, organization, effectiveness of sentences and diction, and for content as well as for overall quality.

i. *Cooperative English Expression Tests: Effectiveness of Expression:* This portion of the well-known battery published by the Cooperative Test Division of Educational Testing Service was administered to all students in Composition and Literature both as a pretest (at the beginning of the year) and as a posttest (at the end of the year).

The essay examinations were graded by multiple readers after appropriate precautions were taken to guard against halo effects. It was impossible for graders to determine whether individual essay papers were written by students in an experimental or control section. (When essays were scored in terms of letter grades, these grades were converted to numerical equivalents in order to facilitate statistical manipulations.)

Estimates of reliability for these tests and correlations between the tests and the final examinations are cited in *Appendix III-I.* Although there is a degree of overlap between the functions measured by the "critical thinking" tests and the final examinations, it is apparent from these data that the two kinds of tests are sufficiently independent to warrant separate analyses of each.

Stereotypes and Misconceptions—Changes in stereotypes and misconceptions were investigated in four courses by means of three instruments which were administered as pretests (at the beginning of the course) and as posttests (near the end of the course). A brief description of the evaluative instruments and their statistical characteristics is given below.

Stereotypes in Social Studies: Consists of 23 items, 13 of which are critical (i.e., scored) and 10 of which are distractors (not scored). Every item is a statement like "Dictatorships inevitably go to war." Students are required to indicate the extent of their agreement or disagreement with each item on a 5-point continuum ranging from "1. Completely Agree" to "5. Completely Disagree." Scoring is accomplished by averaging the weights of their responses. The corrected split-half reliability of this measure is 0.48.

Stereotypes in Business and Government: Consists of 30 statements, 24 of which are scored and 6 of which are distractors. An example of statements included in this test is: "The vast majority of business men oppose any kind of governmental regulation of business." Students are required to indicate the extent of their agreement or disagreement with each statement on a 5-point continuum ranging from "*1.* Strongly Agree" to "5. Strongly Disagree." A student's score is the sum of the weights of his responses to the 24 critical items. The corrected split-half reliability of this measure is 0.68.

Misconceptions in Psychology: This test consists of 52 common misconceptions similar to "The height of the brow is a good index of intelligence." Students are required to respond to each statement as a true-false item. Since 22 of the items are distractors, the best possible score on this test is 30. The corrected split-half reliability is 0.55.

The three instruments described above are somewhat weak from the standpoint of homogeneity (split-half correlations). Nevertheless, they are of considerable interest because they measure in an area quite apart from that usually included in course examinations.

Long-Term Retention—An outstanding feature of the evaluative studies of large group instruction heretofore reported is that they have used measures of immediate recall as the criterion. A given level of performance on a recall test like the final examination does not, however, guarantee a comparable level of subject-matter retention after a lapse of time.

The continuation of the Experimental Study in Instructional Procedures over a three-and-a-half year period made it possible to investigate the differential effects, if any, of large- and small-group instruction upon long-term retention. The retention tests consisted of objective items selected from those contained in the final course examinations. These items were selected, in most cases, on the basis of item analysis data supportive of their discriminative power. The retention tests were administered one to two years after the students had completed a particular course.

MEASURES OF STUDENT ATTITUDES

Attitudes Toward Large Group Instruction—It is of considerable interest to know how students feel about receiving instruction in large groups rather than in conventional sections. Strongly unfavorable student attitudes about either TV or LC instruction, if present, would represent a serious public relations problem apart from any carry-over from attitude to achievement. It is important, in addition, to become cognizant of those specific features of TV and LC instruction which constitute strengths and weaknesses as far as the students are concerned. Finally, it is of value to gain information about the factors which condition or influence student attitudes about the mode of instruction.

Several measures of student attitudes and opinions about the experimental classroom procedures were utilized at various times during the Study.

1. Preliminary Opinionnaires: The purpose of the preliminary opinionnaires was to solicit from the students an expression of their initial reactions to assignment to an experimental (TV or LC) section. These questionnaires were very brief, and the component items were arranged in a multiple-choice format with provision for comment. The alternatives for each item were judged by a sample of undergraduates to be spaced equidistantly along a continuum of favorability-unfavorability to assignment in an experimental section. This feature permitted "scoring" responses to each item and facilitated the comparison between preliminary student opinions and their opinions expressed after exposure to the TV or LC procedure for a semester or a year.

2. TV Scale: This scale required students to evaluate the effectiveness of televised instruction in comparison to conventional (small class) instruction. It was designed for administration in TV sections after the students had received televised instruction for a period of time.

The TV Scale was developed by means of the Thurstone scaling procedure utilizing a nine-point continuum with 5.0 as the neutral point. Scores above 5.0 favor conventional instruction over TV instruction, whereas scores below 5.0 favor televised over conventional instruction. The corrected split-half reliability of this scale is 0.89.

3. TV Opinionnaire: This opinionnaire was developed as a diagnostic device rather than as an attitude scale. Its purpose was to enable students to indicate some of the specific strengths and weaknesses of televised instruction with particular reference to the quality of the televised presentations, the mechanical aspects of production and reception, and the proctor's conduct in the receiving room.

4. LC Scale: This scale paralleled the TV Scale except that its purpose was to scale student attitudes toward large (not televised) sections in comparison to small sections. It is a Thurstone-type scale developed about a nine-point continuum with 5.0 as the neutral point. Scores above 5.0 favor conventional over LC instruction. The corrected split-half reliability of the LC Scale is 0.92.

5. TV-LC Scale: It was necessary, on occasion, to determine how students felt about TV instruction compared to other kinds of large-group instruction. Accordingly, the TV-LC Scale was devised to facilitate this comparison. This scale is again of the Thurstone variety wherein scores above 5.0 favor large class non-televised instruction over TV instruction. The corrected split-half reliability of the scale is 0.90.

Attitudes Toward the Course and the Instructor—Opponents of large group instruction frequently object to such "mass education" because it is presumed to inhibit or eliminate the ability of the teacher to awaken and fan the spark of interest which may lead to a vocational career in a particular subject-matter field. Are we sacrificing student motivation and interest when we assign students to large classes (including TV) or to classes taught by novice instructors (graduate student assistants) rather than to sections of conventional size taught by full-time faculty members? Do students perceive their instructors as being more or less effective in large (and TV) sections than in small sections?

Two attitude scales were designed specifically for the purpose of measuring student reaction to the course and to the instructor.

C Scale (Course rating): This Thurstone-type scale required students to evaluate the course content. The neutral point is 5.0. Scores above this point are unfavorable (i.e. the course content is rated as less significant and stimulating than that of the usual or typical course). Scores below 5.0 are favorable. The corrected split-half reliability of the C Scale is 0.92.

I Scale (Instructor rating): Students were required to rate their instructor on each of twenty-four items related to teaching effectiveness. The items selected for inclusion in this scale were drawn from a pool of approximately 100 preliminary items. Student judges rated each of the preliminary items in terms of its importance as a determinant of teaching effectiveness. The 24 items contained in the I Scale were those consistently rated as most important.

The response categories for the I Scale were weighted so as to yield a mean score of 5.0 for an "average" instructor. Scores above 5.0 are "unfavorable" (i.e., the instructor is less effective than the average teacher). Although the theoretical neutral point of this scale is 5.0, the obtained distributions of ratings assigned by students to a large sample of instructors is positively skewed. The scale has an actual neutral point closer to 4.0 than 5.0.[1] The corrected split-half reliability of the I Scale is 0.91.

Tape Recorded Interviews: Attitude scales and opinionnaires are of only limited utility in eliciting detailed elaborations of the type accessible to an interviewer. Consequently tape-recorded interviews were conducted with samples of students enrolled in the experimental sections of a number of courses included in the Study.

The recording procedure has been described elsewhere.[2] In general, interviews were conducted three times during the course: once near the beginning of the semester, once near mid-semester, and finally near the end of the course. Students were selected for interviews on the basis of their responses to the various attitude scales so that a range of favorable and unfavorable attitudes might be represented in the group. Groups ranging in size from 8 to 12 were found to be optimal.

Although this procedure did not yield a measure amenable to statistical manipulation, it contributed substantially to the total evaluative procedure by adding depth to the information obtained from scaled attitude responses. In addition, playback of the tape to the instructor concerned was uniformly felt to be of considerable value for the improvement of instructional technique.

INSTRUCTOR ATTITUDES

Various kinds of questionnaires concerning the relative strengths and weaknesses of the experimental procedures were submitted to the instructors participating in the Study. In addition, an open-ended type of questionnaire concerning large group instruction was distributed to the entire faculty in the Spring, 1959. None of these forms was designed for objective scoring. They were developed solely for diagnostic and informational purposes.

DESIGN FOR EVALUATION

The specific designs employed for the numerous investigations performed within the framework of the Study are described in detail in the ensuing chapters. The intent of this section is to set the stage for the presentation and discussion of the evaluative data by outlining the range of problems and questions that were investigated. It must be emphasized that each process described below was not necessarily performed for every course included in the Study. Similarly, certain of the analyses were continued throughout the entire period of the Study whereas others were performed only during one or two years.

STUDENT ACHIEVEMENT

Certainly one of the most critical issues in a study of large group instruction is student achievement. The pressure of mounting enrollment does not, of itself, justify the utilization of larger classes either with or without TV. Alternative courses of action include pursuit of a policy of selective admission combined with the development of a strong state-wide junior college system, and more complete utilization of presently available staff and physical resources. Large group instruction is justified as a partial solution to the problem of quantity only if the data relative to achievement indicate that the quality of instruction is not thereby diminished.

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[1] Instructors in the study probably were "a better than average" group, as is generally the case in experimental situations of this nature.

[2] J. F. Adams, L. Siegel, F. G. Macomber. The use of recorded student interviews in improving instruction. *Improving College and University Teaching*, 7, 3, 75-78, 1959.

Gross Analyses—These analyses involved studies of the comparative achievement of equated groups of students within each course receiving instruction under the experimental and the control conditions. The specific problems requiring gross analyses were:

Problem 1—How did students in the experimental and control sections of each course compare with respect to performance on tests of immediate subject-matter recall?

Problem 2—How did students in the experimental and control sections compare with respect to performance on tests of critical thinking and synthesis?

Problem 3—How did students in the experimental and control sections compare with respect to performance on tests of stereotype and misconception?

Analyses by Ability Subgroups—In a sense, a gross analysis of achievement constitutes an oversimplification of the data. Such an analysis may obscure the differential effects of instructional procedure for subgroups of different academic ability by holding the latter factor constant in the experimental and control sections. It would be quite possible, for example, to find that a gross analysis of achievement might yield no differences between the experimental and control groups because of a cancellation effect caused by neglect of the ability factor. There is no *a priori* reason to assume that the effects of large group instruction should be comparable for students of high and low academic ability. On the contrary, high ability students might acquire more from instruction in experimental than in control sections, whereas low ability students might benefit more from control than from experimental instruction. The converse hypotheses might also be tenable. In either case, the interaction between ability and section assignment as a joint determinant of achievement would be neglected by a gross analysis.

The basic questions related to the matter of instructional procedure and academic ability in interaction were:

Problem 4—How did the achievement of high ability students in experimental sections compare to the achievement of high ability students in the control sections? How did the achievement of low ability students in experimental sections compare to the achievement of low ability students in the control sections?

Long-Term Retention—Studies in the area of long-term retention were designed to reveal whether or not there were any delayed effects upon recall of the students who originally received instruction in the experimental and in the control sections.

Problem 5—How did scores on tests of subject-matter recall administered one to two years after completion of the course compare for those students who had originally received instruction in experimental and in control sections?

STUDENT ATTITUDES

The specific problems relating instructional procedures to student attitudes about the course and the instructor are enumerated below.

Toward the Course—

Problem 6—Were student attitudes about the course influenced by assignment to experimental rather than to a control section?

Problem 7—Were student attitudes about the course differentially influenced by academic ability in interaction with section assignment?

Problem 8—Did students report differential levels of motivation and interest as a result of assignment to experimental rather than to control sections?

Toward the Instructor—

Problem 9—Were student attitudes about the effectiveness of their instructor influenced by assignment to an experimental rather than to a control section?

Problem 10—Were student attitudes about instructor effectiveness differentially affected by academic ability in interaction with section assignment?

Problem 11—Does instructional procedure have any effect upon certain specific criteria of teacher effectiveness?

Toward Experimental Procedures Per Se— The problems investigated in this general area were not comparative in nature. Since the experimental groups were the ones exposed to the large-group procedures, they alone provided data germane to the following problems.

Problem 12—What were the overall student evaluations of the effectiveness of the experimental procedures at the end of the semester or course?

Problem 13—Did these overall evaluations differ for students of high and of low academic ability?

Problem 14—What specific features were considered by the students to be strengths and weaknesses of the experimental procedures?

Problem 15—To what extent did student opinion about TV and LC instruction change from the beginning to the end of the course (or semester)?

Problem 16—What is the extent of the relationship between student attitudes toward the method of instruction and their attitudes toward the instructor?

Problem 17—Were student attitudes toward large group instruction related to certain measured personality variables?

Problem 18—Were student attitudes toward TV instruction related to the attitudes of the assistant instructors in charge of the receiving rooms?

Problem 19—Was achievement in the TV and LC sections related to student attitudes about receiving experimental rather than conventional instruction?

INSTRUCTOR ATTITUDES

Student attitudes and opinions about large group instruction are both valuable and important. The picture would be incomplete, however, without examination of the other side of the coin: *i.e.* how instructors react to large group teaching.

Toward Television—

Problem 20—How did experienced TV teachers feel about televised classroom instruction?

Problem 21—How did faculty members who had not taught by television feel about TV classroom instruction?

Problem 22—What constitutes an adequate and desirable load adjustment for TV teachers?

Toward Other Large Group Procedures—

Problem 23—How did experienced teachers of large groups feel about such large-group instruction?

Problem 24—How did faculty members who had not taught large groups feel about large-group (non-televised instruction?

The foregoing enumeration of problems indicates the range of evaluative investigations included within the scope of ESIP since its inception. The chapters which follow summarize the specific research designs applicable to these problems and the data germane to these problems obtained since February, 1956.

Chapter IV: Evaluation of Student Achievement

The comparative studies of student achievement may be summarized most conveniently by dividing them into three categories: (1) studies that required gross analyses of the data, (2) studies that required separate analyses for students of high and low ability, and (3) studies of long-term retention rather than of immediate recall.

GROSS ANALYSES

These analyses involved simple comparisons between the achievement levels of students assigned to experimental and to control sections. All of these studies were predicated upon a matched-group design utilizing at least one experimental section and one control section of each course. The criterion instruments were administered simultaneously at the end of the semester to students in the two types of section in order to prevent leakage of test information.

PROBLEM 1: Comparative performance of the experimental and control groups on tests of subject-matter knowledge.

The criteria of achievement defined as the acquisition of subject-matter knowledge were the course examinations administered for the purpose of assigning final grades. These tests were most often objective in nature. Whenever the final examination contained both objective and subjective questions, the former only were used as the basis for providing data relative to subject-matter knowledge. (The essay portions of the final examinations were used, when appropriate, as measures of problem solving and synthesis.) Thus the criteria for *Problem 1* were directed toward measuring immediate recall of facts and the routine application of fundamental principles. They did not often contain items designed to measure in the area of synthesis or integration.

The statistical technique usually applied to these data was the t-ratio. This ratio indicates the likelihood that an obtained difference between mean test scores is a chance rather than a real difference. The greater the likelihood that an obtained difference is attributable to chance, the stronger is the evidence in support of the null hypothesis: *i.e.* the two distributions of data compared represent randomly drawn samples from the same population. Thus in order to reject the null hypothesis, the t-ratio must be sufficiently high to indicate only a negligible probability that the obtained difference between mean scores is attributable to chance.

The usual convention, and the one followed in this report, is to require probabilities at or better than the *.05* level before referring to "statistically significant differences." A t-ratio indicative of significance at the *.05* level means that one would anticipate a difference as great as or greater than was actually obtained solely on the basis of chance only five times in a hundred. The likelihood is strong (95 in 100) that the obtained difference resulted from factors other than chance.

TV Courses—The distributions of test scores obtained in the TV and control sections of all courses investigated, as well as appropriate t-ratios, are summarized in full in *Appendix IV-1*. The t-ratios computed for these comparisons are graphed also in *Figure 4-1*. The base line of this graph indicates the probability (p) level corresponding to various t-ratios. A t-ratio of 1.96 is required to indicate statistical significance at the *.05* level. Comparisons which yielded t-ratios of lesser magnitude are not statistically significant. (Only obtained t-ratios in excess of 1.04 are plotted in this graph.)

The twenty-six comparisons summarized in *Figure 4-1* involve eight different full-year courses taught to equated TV and control sections during the three-and-a-half year period of the Study. (Comparisons for 1955-1956 involved only the second semester of the year sequence.) TV sections were compared with conventional sections in all cases with the exception of Human Biology and American Government. The comparisons in these two courses were between TV and LC sections rather than between TV and conventional sections.

The data summarized in *Figure 4-1* indicate that the achievement levels of students in the TV sections were, in general, comparable to the achievement levels of students in the control sections. Only four of the 26 comparisons produced statistically significant differences: TV instruction was superior to LC instruction in Human Biology, and conventional instruction was superior (second semester, 1956-1957) to TV instruction in Foundations of Human Behavior, Air Science and Economics.

The 1956-1957 year produced interesting data for the TV-control group comparisons. The findings obtained during this one year led to the suspicion that TV instruction might have a cumulatively deleterious effect upon achievement. This suspicion was clearly dissipated, however, by the results obtained during the two years that followed.

LC Courses—The distributions of test scores in the LC and control sections are fully summarized in *Appendix IV-1*. The t-ratios for these comparisons are also graphed in *Figure 4-2*.

Forty-five comparisons were made between the LC and control sections of 17 different courses. Only four of these comparisons met the requirement for statistical significance: three favored conventional instruction and one favored LC instruction.

Certain courses were studied rather intensively during periods ranging between two and three years in order to isolate consistent patterns, if indeed there were any, attributable to the subject-matter itself. Such consistency was not apparent in any course with the exception of Social Studies wherein LC instruction appeared to produce consistently lower achievement than did conventional instruction. These differences, although consistent, were not statistically significant.

IS Courses—Two courses utilizing independent study sections were included in this series of investigations: International Politics and Growth of American Civilization.

The distributions of final examination scores in the IS courses are summarized along with the appropriate t-ratios in *Appendix IV-1*. The t-ratios are also shown graphically in *Figure 4-3*.

It is apparent that within the narrow limits of this phase of the Study, independent study section assignment did not adversely affect achievement.

Figure 4-1

T-Ratios for Comparisons Between Subject Matter Objective Tests in TV and in Control Sections

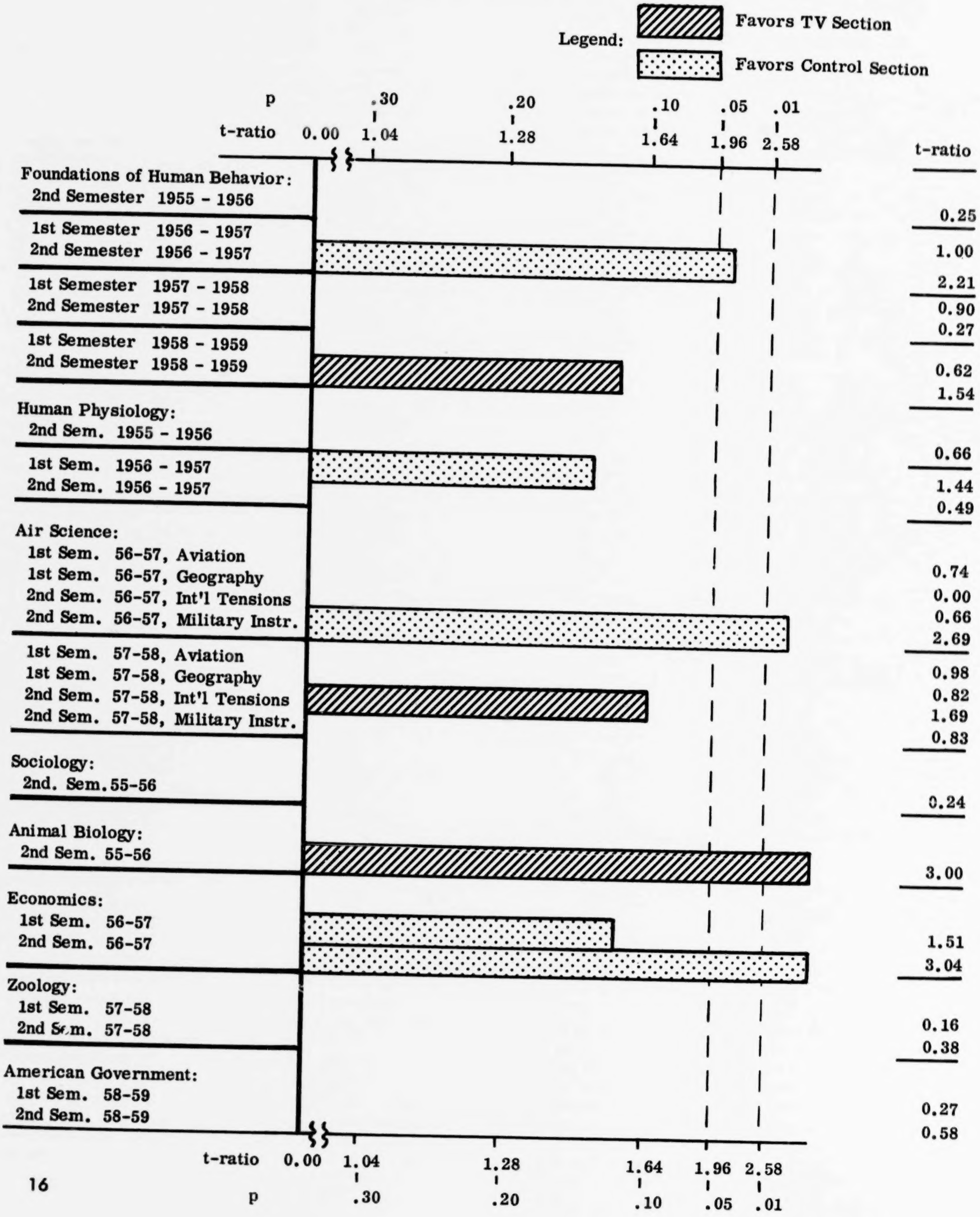


Figure 4-2

T-Ratios for Comparisons Between Subject Matter Objective Tests in LC and in Control Sections

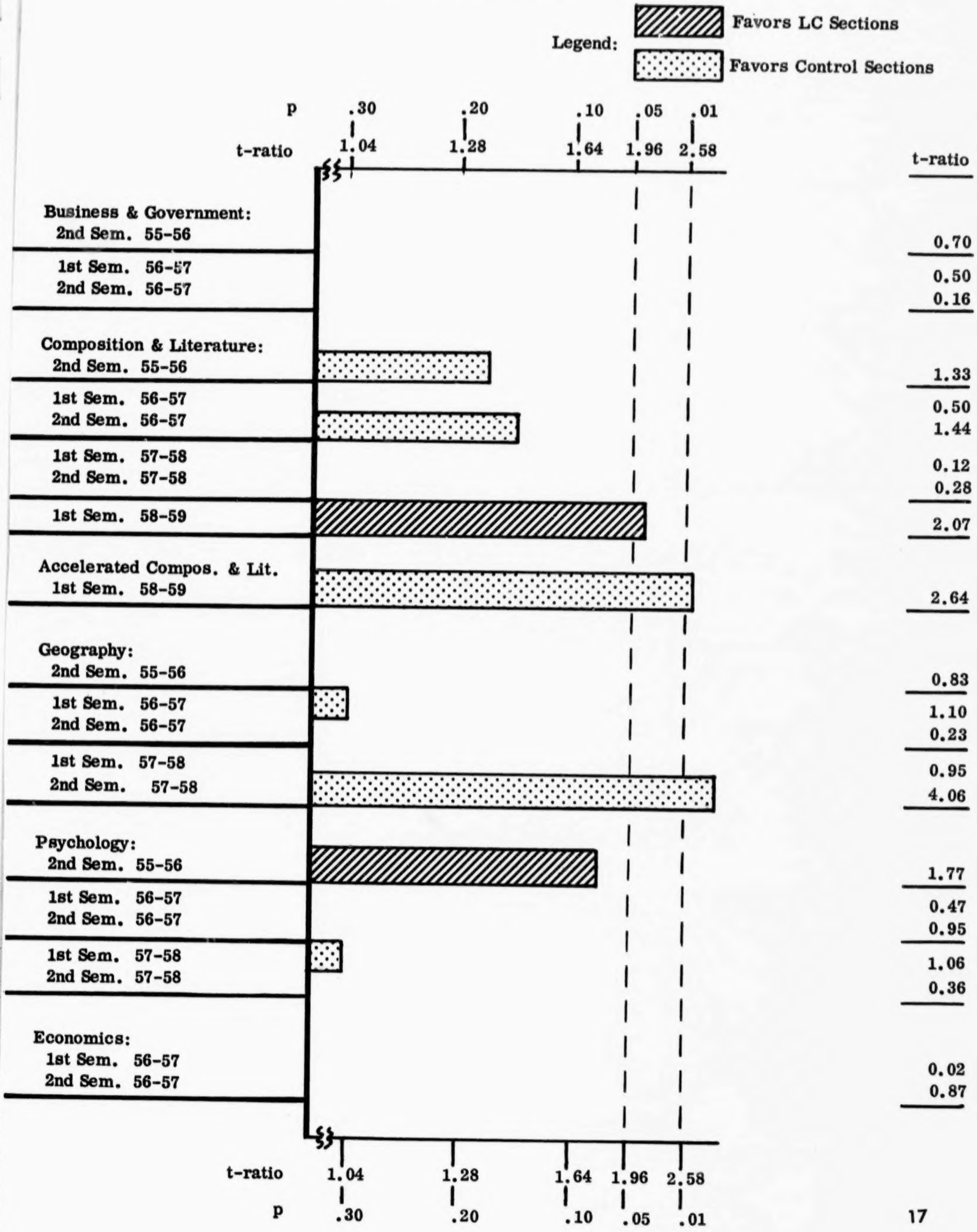


Figure 4-2 con't.

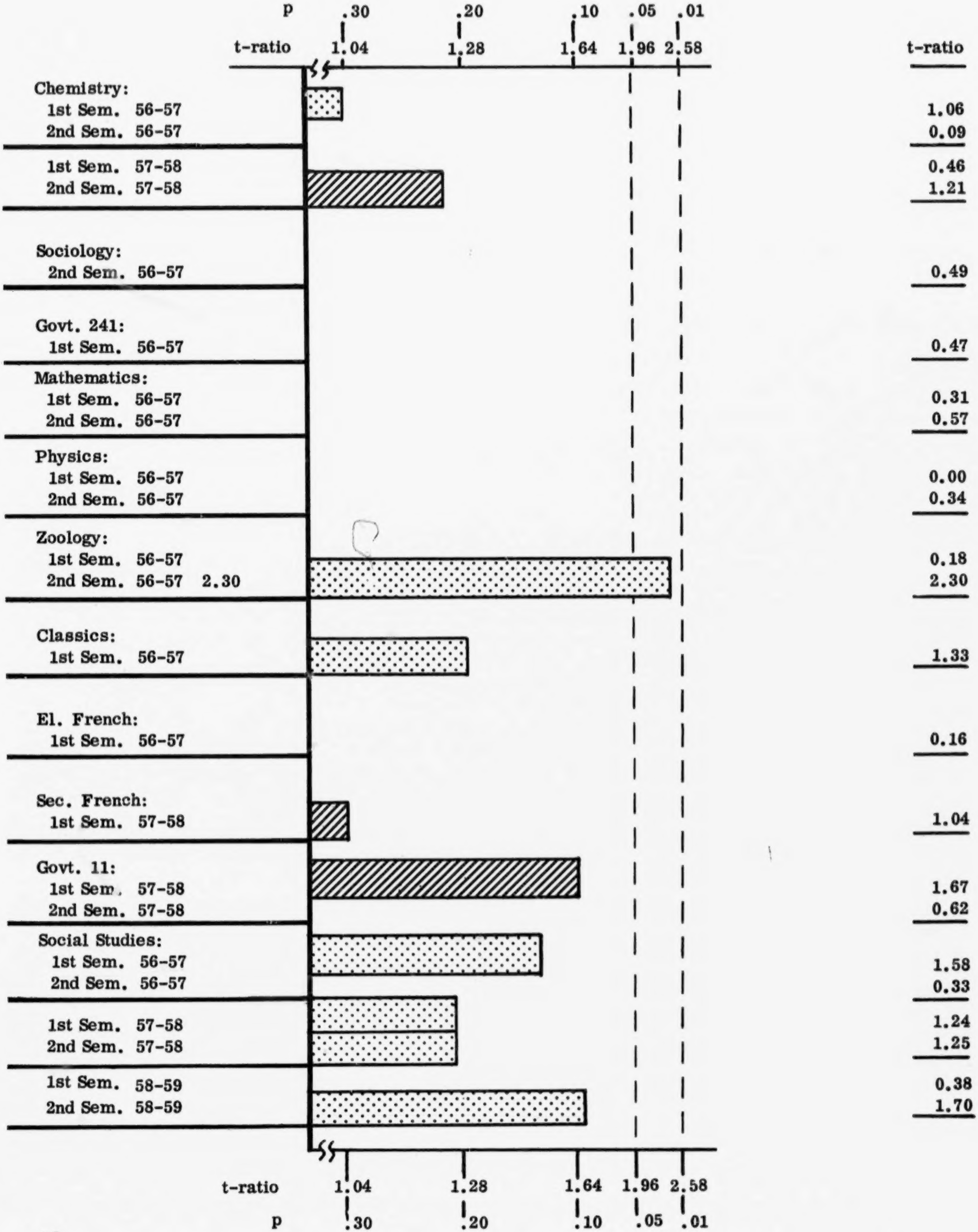
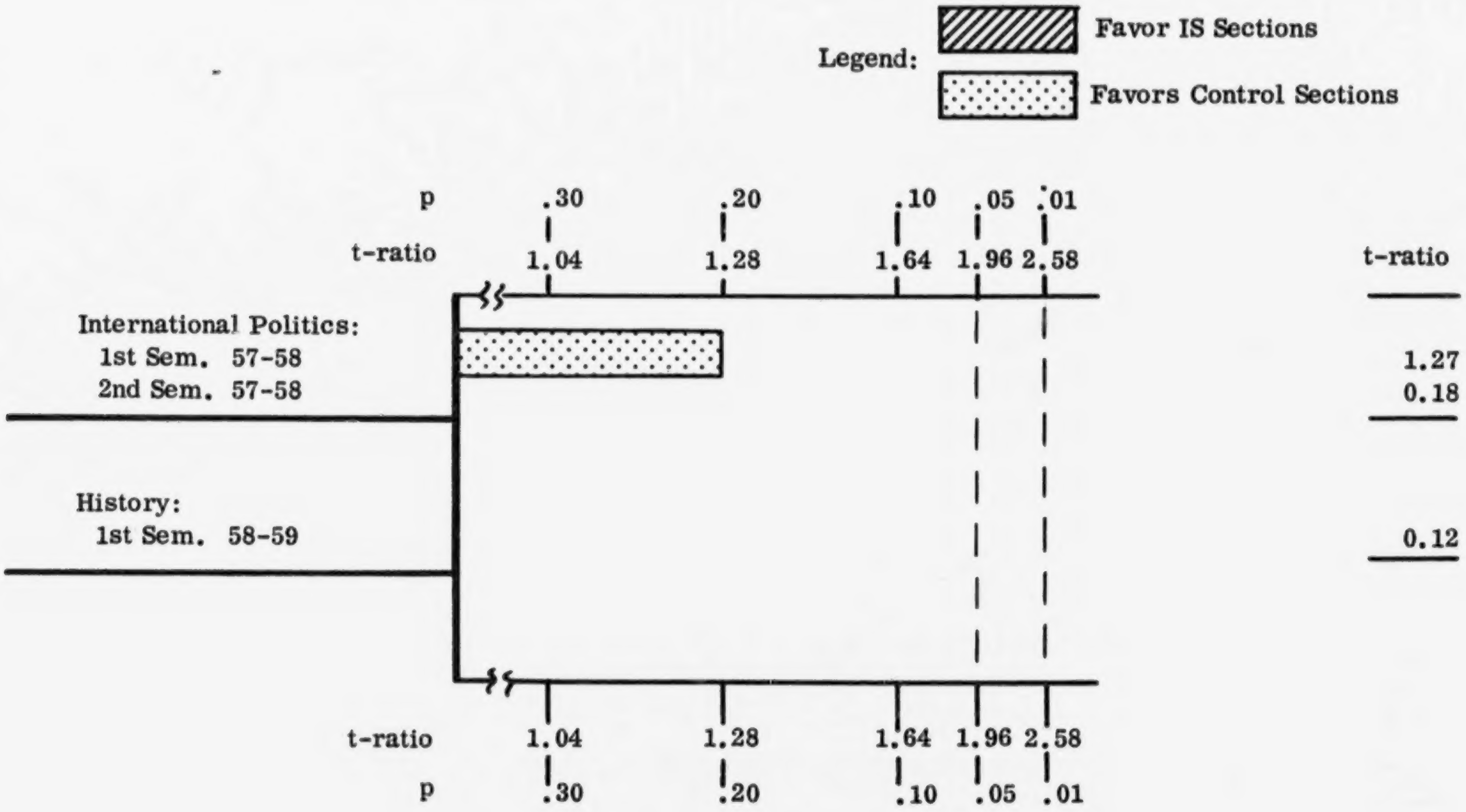


Figure 4-3

T-Ratios for Comparisons Between Scores on Subject Matter Objective Tests in IS and Control Sections



GS Courses—Three courses taught by graduate student assistants provided data for this phase of the Study. Two of these courses (Principles of Modern Business and Principles of Geology) were studied rather extensively.

The distributions of obtained data (see *Appendix IV-I*) and the graphic summary of t-ratios in *Figure 4-4* indicate that graduate student assistants succeeded fairly well in conveying the kind of information measured by final examinations. The data for Composition and Literature indicate that GS instruction was in this regard superior to instruction by regular faculty members. The comparison for this course was, however, based solely upon the results obtained from a single semester.

Of the three courses studied, Geology appeared to be least adaptable to GS instruction. The students in the GS sections of Geology tended consistently to perform less well on the achievement tests than did the students in the control sections.

Conclusion—The most consistent feature about the comparative studies of scores on subject-matter tests earned by students in the experimental and control sections is the dearth of obtained differences which were statistically significant. It is quite apparent that, with few exceptions, large group instruction is about as effective in this regard as is small group (conventional) instruction. The exceptions which did appear did not occur with greater frequency under one experimental condition than under another. Rather, the unique instances wherein students in the experimental sections achieved either significantly more or significantly less than the students in the control sections are probably attributable to specific features related to the course content or the instructor's technique rather than to large group instruction *per se*.

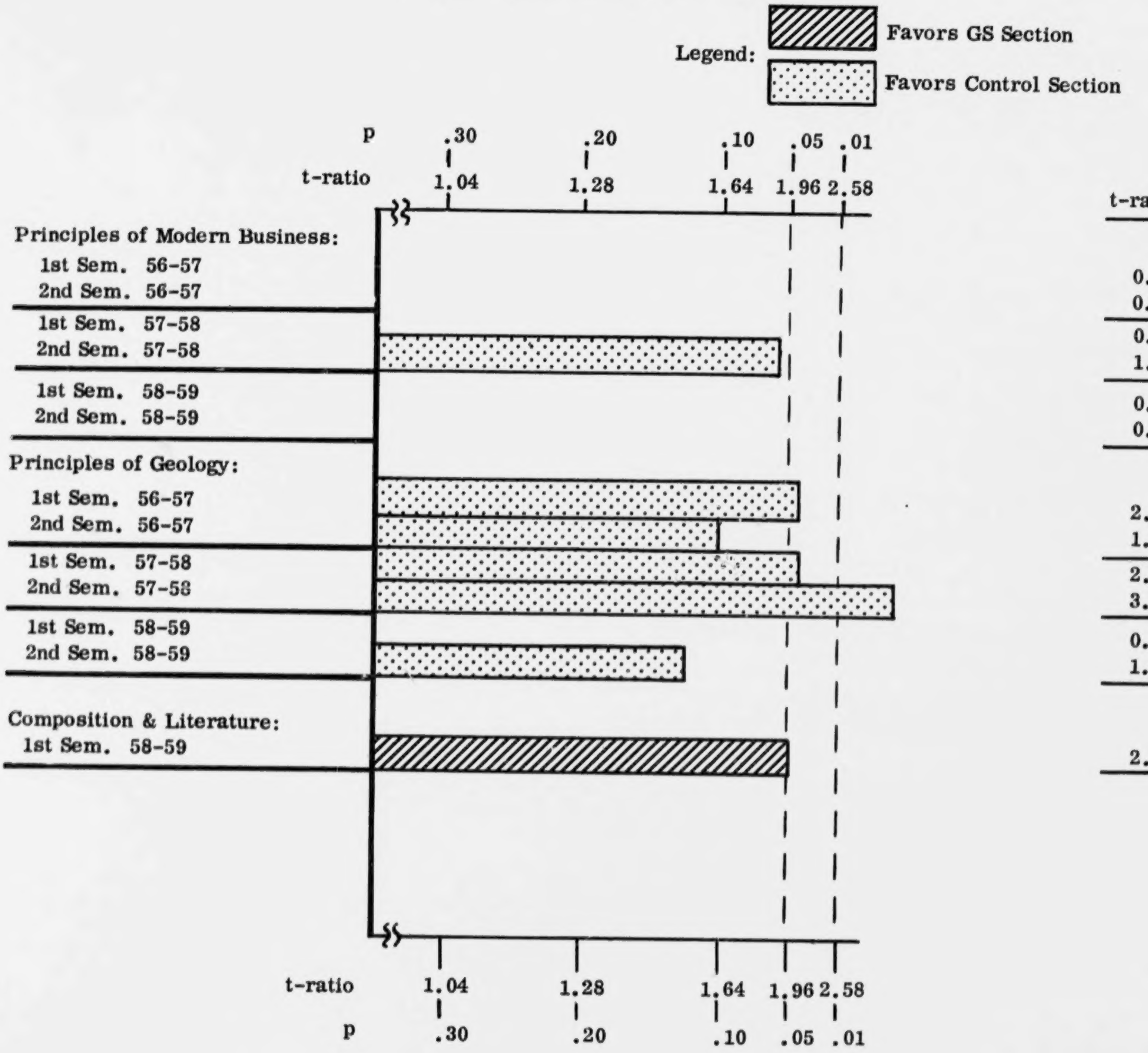
PROBLEM 2: Comparative performance of the experimental and control groups in tests of problem solving and synthesis.

As indicated earlier, the definition of achievement in terms of the objective portions of a final examination is extremely restrictive. A fundamental objective of higher education is to develop the student's ability to integrate factual knowledge in new ways and to apply it to the solution of problems not previously encountered.

The criterion measures of synthesis and problem solving were administered during class meetings near the end of the school year. The distributions of scores earned on these measures by students in the experimental and control sections are summarized in *Appendix IV-II*. Scores on essay and case examinations were computed by averaging the scores independently assigned by two readers. Because of the relatively low grader-intercorrelations in Marketing, however, scores differing by more than one letter

Figure 4-4

T-Ratios for Comparisons Between Scores on Subject Matter Objective Tests in GS and Control Sections



grade were "arbitrated" rather than averaged.

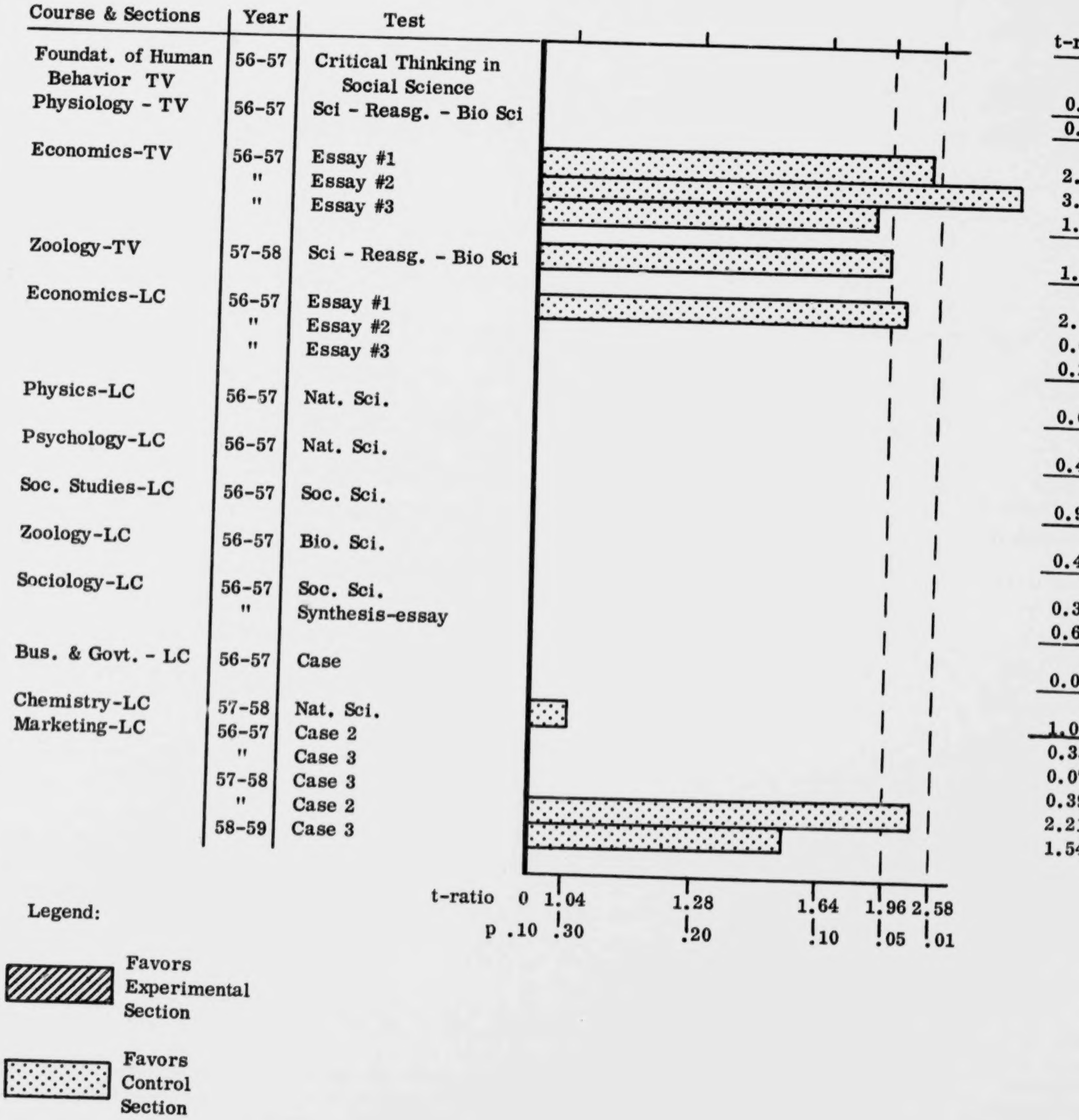
The t-ratios for the experimental-control group comparisons are summarized graphically in *Figure 4-5* Even though pretests were not administered in these courses, the experimental and control sections were equated on the basis of academic ability (as measured by the ACE). This fact lends confidence to interpretations of the data presented in *Figure 4-5*.

Conventional instruction was particularly superior in this regard in Marketing and Economics. In the latter course it may be inferred also that LC instruction produced results that were somewhat superior to those obtained with TV instruction. This inference is supported by the data obtained for Zoology (1957-1958) wherein TV instruction was compared directly to LC rather than to conventional instruction.

The evidence in favor of conventional instruction rather than lar
group procedures with respect to c
teria of problem solving and synthe
is far from overwhelming. The resu
obtained in nine of the twelve cours
studied support the null hypothes
Thus although students in the expe
mental sections of three courses we
found to perform less well on te
of synthesis and problem solving th
students in the control sections, th
finding did not apply to the remai
ing nine courses investigated.

Figure 4-5

T-Ratios for Comparisons Between Scores on Tests of Problem Solving and Synthesis

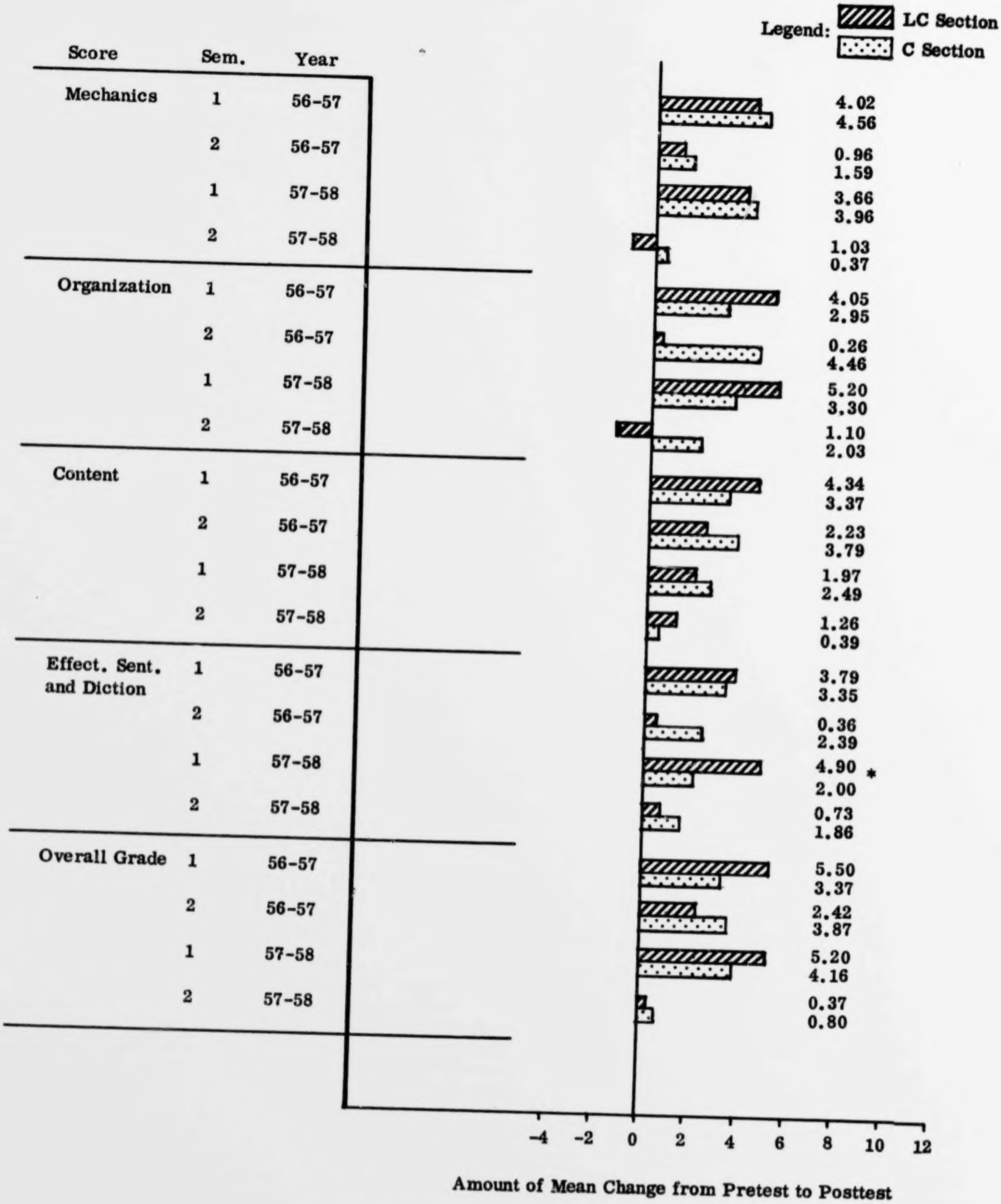


The development of the ability to synthesize was investigated also in Composition and Literature. The evaluative criterion was a writing assignment completed in class as a pretest (at the beginning of the semester) and as a posttest (at the end of the semester). This design permitted the calculation of analyses of covariance controlling for inequalities in the pretest scores. The distributions of scores obtained in the LC and C sections of the course are summarized in *Appendix IV-II*.

The mean changes in scores from pretest to posttest administrations are shown graphically in *Figure 4-6*. The numerical conversions of the letter

Figure 4-6

Mean Change in Pretest and Posttest Grades in Composition and Literature Themes



grades assigned by the readers were such that D=65.00, C=75.00, B=85.00, etc. Thus a mean change of ten points is equivalent to a full letter grade. This figure shows the mean increment or decrement from pretest to posttest score on each variable in the experimental and in the control section.

The average amount of change from pretest to posttest scores was, in general, about the same for the LC and Control sections. The only significant difference occurred during the second semester, 1957-1958, on the Effective Sentences and Diction variable. Since the entire study involved twenty comparisons (five subscores for each of four semesters) only one of which yielded a statistically significant difference, it appears that LC instruction did not adversely affect student performance on the very important criterion of writing proficiency.

Conclusion—Criteria of achievement defined as problem solution and synthesis were utilized only in the TV and LC phases of the Study. The results support the general conclusion that large group instruction does not lead to reduced proficiency in these areas. The few instances wherein performance on these criteria was significantly lower for the experimental (TV or LC) sections than for the control sections are probably attributable to instructor or course variables rather than to the variables of class size and instructional procedure.

PROBLEM 3: Comparative performance of the experimental and control groups on tests of stereotype and misconception.

A major instructional objective of four of the courses included in the Study was to overcome certain stereotypes and misconceptions initially held by the students. Comparative studies were conducted to determine the extent to which this objective was realized in the experimental and control sections of these courses.

The criterion measures were administered in each section of these courses as a pretest and again as a posttest. The covariance analyses summarized in *Appendix IV-III* were necessitated by inequalities in the pretest scores earned by students in the experimental and control sections. These inequalities occurred in spite of the fact that these groups were equated on the basis of ACE total score.

Significant differences as a function of instructional procedure were found only in Psychology (1956-1957), wherein the control section showed a greater mean improvement than did the LC section. This finding for Psychology was not replicated, however, when the study was repeated during the following year.

Conclusion—Stereotypes and misconceptions were overcome to about the same extent by students in both the experimental and the control sections of the courses wherein this objective was the major one.

ANALYSES BY ABILITY SUBGROUPS

PROBLEM 4: Comparative achievement of students at given levels of ability who were assigned to the experimental and to the control sections.

The basic question related to this problem is: Did the high ability and the low ability students achieve as much when assigned to the experimental section of a course as they did when assigned to the control section of that course?

This question was investigated in two ways. First, the possibility of interactive effects of ability and section assignment in combination was investigated at the end of each semester. Ability as used here was defined by the total ACE score. High ability students were those who scored at or above the fiftieth percentile on the ACE; low ability students were those who scored at or below the forty-ninth percentile. It must be recognized that such dichotomization at the median produced two ability subgroups which were contaminated, to some extent, because each contained students of about mid-range ability. The small sizes of the control sections, however, prohibited delineation of the ability subgroups on the basis of just the tails of the ACE distribution.

A second approach to this problem was taken upon completion of the data gathering phases of the Study in the attempt to purify the ability subgroups. This approach involved the compilation of achievement data across years. The effect of this compilation was to produce experimental and control groups which were sufficiently large, in a number of courses, to permit a more restrictive definition of "high" and "low" ability. High ability students, for these analyses, scored at or above the seventy-fifth percentile on the ACE; low ability students were those who scored at or below the twenty-fifth percentile.

It was impossible, of course, to compile data across years directly because the final examinations administered in each course differed from one year to another. Thus it was necessary to transform all raw test scores to standard (T)scores with a mean of 50.00 and a standard deviation of 10.00. The T-score conversion table for every course each semester was based solely upon the distributions of raw scores obtained in the experimental sections, rather than upon the combined distributions of scores obtained in both the experimental and control sections. The effect of utilizing the combined distributions for arriving at the T-score conversions, if this procedure had been followed, would have been to completely obliterate any obtained differences between achievement in the experimental and control sections of the course. Such a procedure would have defeated the entire purpose of the analysis.

The data germane to the problem of possible interactive effects of ability in combination with section assignment are summarized separately for achievement defined as subject-matter knowledge *(Appendix IV-IV)* and as problem solving and synthesis *(Appendix IV-V)*.

TV Courses—Six different courses were included in the analyses by semester, and the data from three of these courses were analyzed across years.

It is quite clear from these data that high ability students performed equally well on the objective criteria of subject-matter achievement regardless of whether they were assigned to the TV or the control section. There is some evidence, however, that when a criterion measuring synthesis rather than simple recall was utilized, control instruction was superior to TV instruction for the high ability students enrolled in Economics.

The data for low ability students are inconsistent. Control instruction was significantly superior to TV instruction for low ability students in Foundations of Human Behavior and in Government. Conversely, TV instruction was superior to control instruction for low ability students in Physiology and in Zoology.

LC Courses—The possibility of interactive effects of ability and section assignment was investigated in thirteen different LC courses. The results were essentially negative. Both the high and low ability subgroups performed equally well regardless of section assignment.

IS Courses—The sampling of independent study courses was exceedingly small; only two such courses were utilized. In both instances, ability was not found to interact with section assignment as a joint determinant of achievement.

GS Courses—The evidence indicates that, in Introductory Business at least, high ability students achieved as much when taught by graduate student assistants as when taught by regular faculty members. Similarly, low ability students achieved about as much regardless of section assignment.

A rather unique finding occurred in Composition and Literature wherein the high ability students in the GS sections scored significantly higher on the objective final examination than did students of comparable ability in the control sections. This finding, however, is based upon results obtained from a single semester, and is therefore not amenable to generalization.

Conclusion—The weight of the evidence concerning the possibility of differential effects of large and small group instruction upon the achievement of students of high and low academic ability is negative. Thus it appears that there is no reason to select students on the basis of academic ability for assignment to large (including TV) sections rather than to conventional sections. As a corollary, there is no evidence supporting either an achievement decrement or an achievement gain in the experimental sections as a function of the student's level of academic ability.

THE RETENTION STUDY

PROBLEM 5: Comparative long-term retention of subject-matter by students assigned to experimental and to control sections.

The findings thus far reported for large group instruction indicate that students taught in large and in TV sections achieve about as much as those taught in small classes. This conclusion is based upon investigations utilizing measures of immediate subject-matter recall. It is appropriate to inquire, however, whether there are differential effects of the experimental and control procedures upon measures of delayed recall. Thus, a comparative study was conducted of the effect of TV, LC and GS instruction as opposed to conventional instruction upon subject-matter retention after a time lapse. The time interval between original instruction and the retention test ranged between one and two years.

The participants in the retention study were those students who were enrolled in the experimental or control sections of nine different courses during the 1956-1957 and 1957-1958 academic years and were still in residence in April, 1959. Contacts were made with 1,277 students who were still in residence of approximately 3,000 students originally enrolled in the nine courses.

Each of the 1,277 students available for the retention study received a letter informing him of the fact that he was to report to a given room on the campus at a specified time for research purposes. Although these students knew that the request came from the office of the Experimental Study in Instructional Procedures, they were not informed about the nature of the specific task they were to perform.

Approximately 80 per cent (1,022 students) of the group contacted complied with the request and were asked to take the retention tests. These tests were proctored by the instructors who had taught the courses originally, and they reported a uniformly high level of student motivation. This was substantiated by the fact that a considerable number of students subsequently checked upon their performance on these tests.

It was not possible to use the results of all 1,022 students tested. This sample was a composite of students who had taken courses during two different academic years. It was necessary, therefore, to weight the experimental and control groups for the retention study equally with respect to the proportional representation of students who had originally taken the courses during each of these years. This meant that certain of the students who were tested had to be deliberately eliminated from the final samples. The eliminated cases were randomly determined by alphabetizing within each course and dropping every *nth* case. In addition, all students had to be eliminated who had taken additional course work in the departments concerned beyond the specific course included in the retention study. These procedures reduced the total number of students actually used for the retention study to 744. The numbers of students within each course who were tested and who were actually used for the study are shown in *Appendix IV-VI*.

Aside from the retention test scores, other data available for these students included their final examination scores earned at the time they were enrolled in the course, and their scores on the ACE and the Cooperative English Test. The final examination scores earned at the time the students were enrolled in the courses were analyzed to determine whether the samples from the experimental and control sections of these courses were comparable with respect to original level of achievement. This analysis took the form of computation of t-ratios to test the significance of the differences between the mean final examination scores of students from the experimental and control sections. The null hypotheses were not refuted. Original level of achievement was therefore not considered to be a factor of consequence in the comparative analysis of the retention scores.

The differences between mean retention test scores earned by students from the experimental and control sections of each course were tested for significance by analyses of covariance. The control variable in these analyses was the total ACE score for all courses with the exception of Composition and Literature. The control variable in this instance was the Cooperative English Test. Scores on the control variables and the retention tests along with the appropriate covariance-ratios are summarized for each course in *Appendix IV-VI*.

The mean retention test scores of students originally enrolled in the experimental and control sections of each of the courses were very similar. None of the covariance-ratios approach statistical significance.

Conclusion—The retention study was limited in scope to nine courses, to retention of subject-matter knowledge of the type measured on objective final examinations, and to a time interval ranging between one and two years after completion of the course. Nevertheless it is noteworthy that within these limitations, long-term retention was clearly unaffected by increased class size or by instructional procedure.

Chapter V: Evaluation of Student Attitudes

Three areas of student attitudes were investigated: 1) attitudes toward the course content, 2) attitudes toward the instructor, and 3) attitudes toward the experimental (TV and LC) classroom procedures. The first two of these areas required comparative studies of student attitude as a function of section assignment. These studies were designed to answer the general inquiry: Did attitudes toward the course and instructor differ significantly for those students assigned to experimental sections and those assigned to control sections? The investigation of attitudes toward the experimental procedures *per se* were not comparative in nature. Rather, these investigations were designed to determine how students who had been receiving instruction in large groups (including TV) felt about these instructional procedures, and to pinpoint some of the strengths and weaknesses of these procedures from the students' point of view.

ATTITUDES TOWARD COURSE CONTENT

The criterion measure for this series of studies was the Course Content Scale (C-Scale) described in Chapter III. This scale yields scores which range between 1.0-9.0 with a neutral point at 5.0. Scores below 5.0 are indicative of favorable attitudes toward the course content.

The C-Scale was administered to students in both the experimental and control sections of virtually every course. It was generally administered during one of the final class meetings near the end of the academic year.

PROBLEM 6: Comparison of student attitudes toward the course as a function of section assignment.

When discussing attitudinal data it is desirable, for rather obvious reasons, to camouflage the identity of specific courses and instructors. Consequently, virtually all data in this chapter are presented for courses designated by code letters rather than by titles. The order in which courses are hereafter listed differs from the sequence of listing in the previous chapters.

The results obtained from administration of the C-Scale in the experimental and control sections of all courses every year are summarized in *Appendix V-1*. This summary indicates whether the experimental section of the course was a TV, LC, GS or IS section, and contains a listing of the standard deviations and means along with the appropriate t-ratios for every administration of the C-Scale.

These data are also shown graphically in *Figures 5-1, 5-2* and *5-3*. The graphs summarize the magnitude of the difference between mean C-Scale scores of students in the experimental and control sections of each course. The direction of these differences is also indicated: *i.e.* shaded bars are used when the mean for the experimental section is lower (more favorable) than the control section mean. The level of statistical significance of the obtained difference between experimental and control group means is indicated only for those comparisons wherein p was *.05* or better.

TV Courses—Comparative C-Scale means in the TV and control sections are summarized in *Figure 5-1*.

Ten of the twelve comparisons shown support a trend of more favorable student attitudes toward the course in the control than in the TV sections. Three of these ten comparisons produced mean differences that were statistically significant.

Course *A* is particularly interesting because it produced data contrary to the usual trend. Two of the comparisons made in this course favored TV over conventional instruction, and the difference obtained during the 1956-1957 academic year was statistically significant. (Subscripts are appended to the code letter for Course *A* because this course was taught by two different instructors. Instructor *1* was responsible for the course from 1955-1957; Instructor *2* was responsible for the course from 1957-1959.)

LC Courses—Thirty-three comparisons between mean C-Scale scores of students in equated LC and control sections are summarized in *Figure 5-2*.

Only six of these comparisons indicated a tendency toward more favorable attitudes in the LC section than in the control section. The mean differences in two of the six instances were statistically significant. The remaining twenty-seven comparisons all favored the control section, although only six of these mean differences met the requirement of statistical significance.

GS Courses—Student ratings of the course content in GS and control sections (see *Figure 5-3*) did not exhibit the consistency characteristic of the TV and LC courses. In one course, *(Bb)* students in the sections taught by graduate assistants clearly felt that the content was less significant and meaningful for them than did the students in the control sections of the same course. Conversely, students in the GS section of course *Cc* rated the course *more* favorably than did students in the control sections.

It will be recalled that the control sections for this phase of the Study were taught by regular faculty members. Thus the inconsistencies noted above probably reflect the differential competencies of the specific instructors and differences in the specific subject-matter areas to a greater extent than they reflect the influence of GS as opposed to control instruction. It is obvious that in the opinion of students GS instruction can be either effective or ineffective, depending upon the enthusiasm and capabilities of the individual graduate student assistants.

Conclusion—Students in the TV and LC sections tended, in general, to rate the course content somewhat less favorably than did students in the control sections of the same courses. It is important to note, however, that this conclusion is subject to exception, particularly in courses *A-1*, *p* and *q*. Such exceptions were relatively infrequent.

It is impossible to generalize about the comparative effectiveness of GS and control instruction as determinants of student attitude toward the course content. Differences in the quality of instruction and in the subject matter areas appeared to outweigh any uniform effect attributable to instruction by graduate student assistants rather than by regular faculty members.

Figure 5-1

Summary of Differences Between Mean Rating of the Course by Students in the TV and in the Control Sections

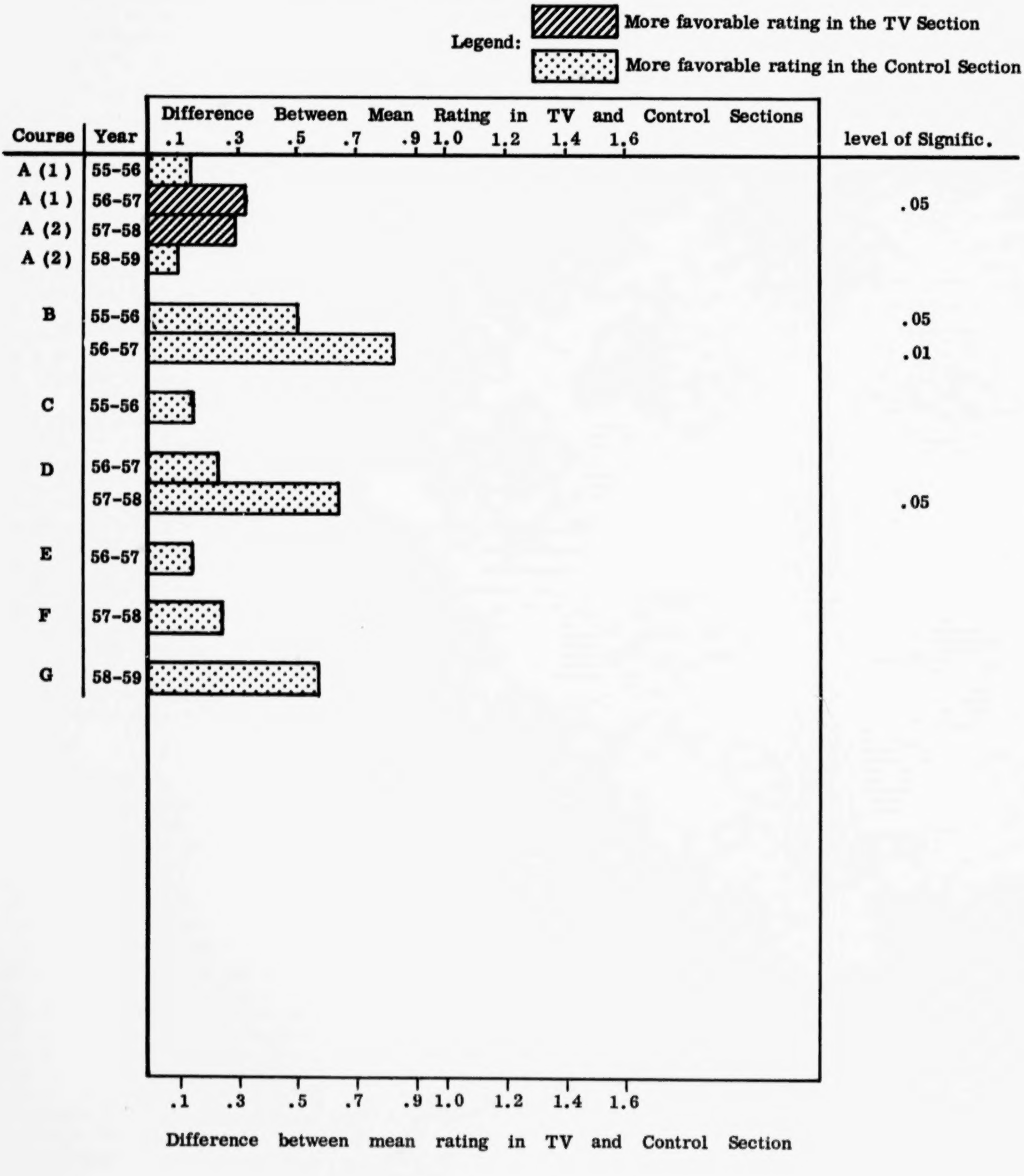


Figure 5-2

Summary of Differences Between Mean Rating of the Course by Students in the LC and Control Sections

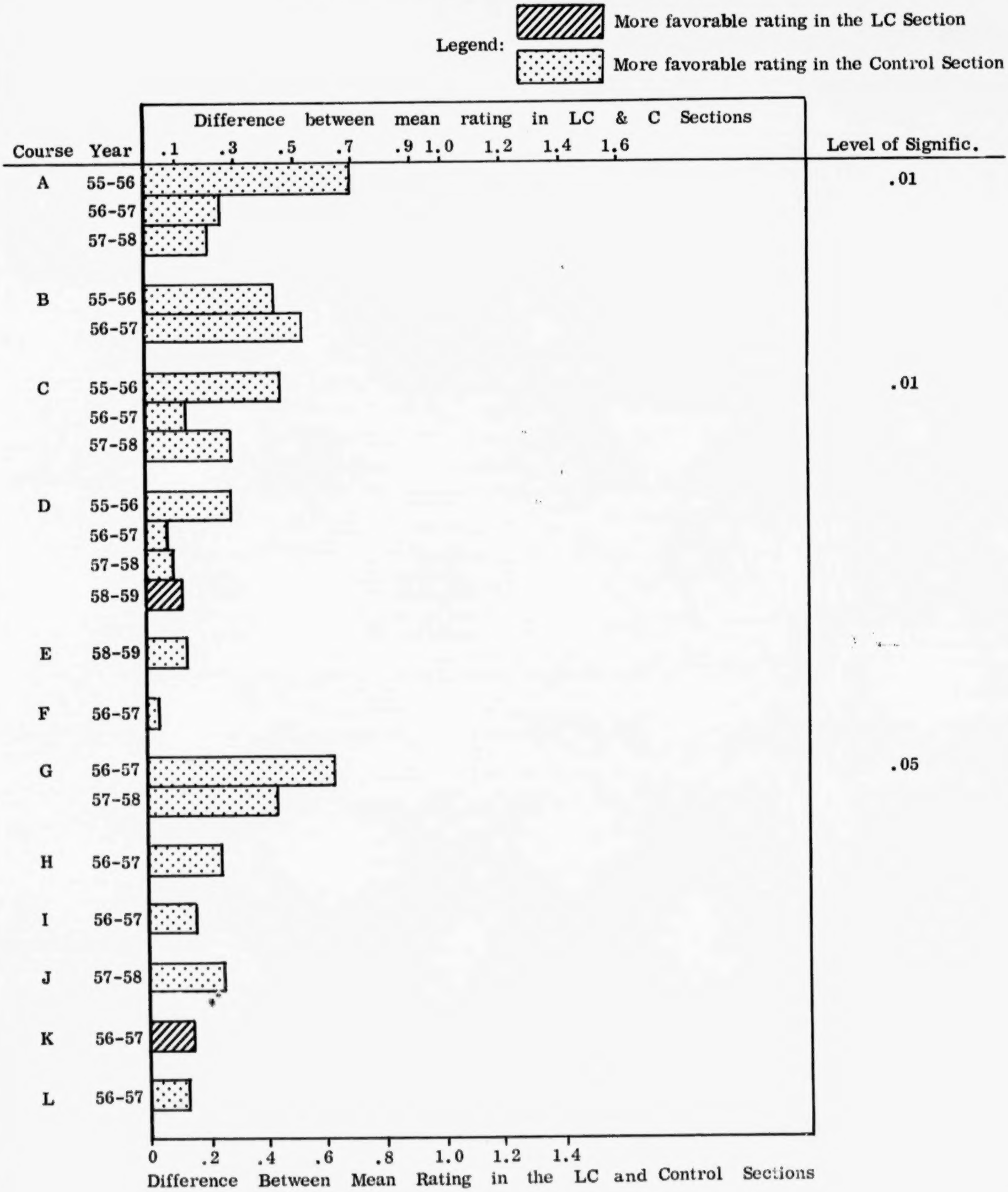
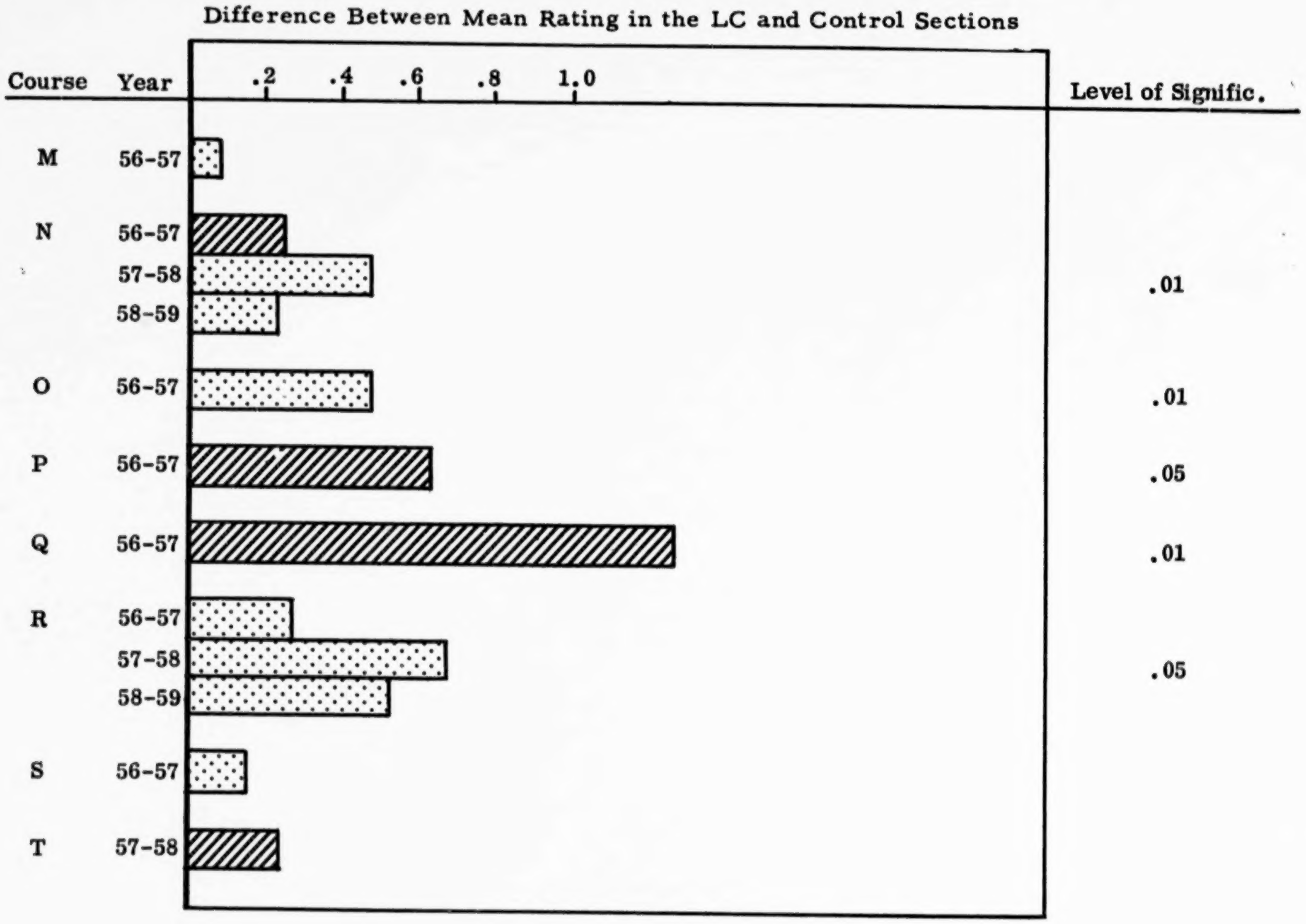


Figure 5-2 Con't.



PROBLEM 7: Student attitudes toward the course as a dual function of section assignment and level of ability.

The ratings of the course assigned by students in the experimental and control sections were further analyzed separately for high and low ability students. The purpose of this analysis was to determine whether academic ability interacted with section assignment as a joint determinant of student attitudes.

The ability subgroups were defined by dichotomization on the basis of ACE total score. Students who scored at or above the fiftieth percentile on the ACE were classified as "high ability students," whereas those who scored at or below the forty-ninth percentile on the ACE constituted the "low ability" subgroup. This series of analyses was conducted only for certain of the courses given during the 1957-1958 academic year.

The distributions of C-Scale scores of high and low ability students in the experimental and control sections of various courses are summarized along with the appropriate t-ratios in *Appendix V-I*. These data are also shown graphically in *Figure 5-4*.

No systematic pattern of interactive effects between level of ability in combination with section assignment as a joint determinant of course rating was evident. Significant differences between mean C-Scale scores were found for low ability students in courses *A* and *F*. In the former, low ability students in the TV section rated the course more favorably than did low ability students in the control section. In course *F*, however, low ability students in the TV section rated the course significantly *less* favorably than did students of similar ability in the control section.

High ability students, on the other hand, rated courses *n* and *Bb* less favorably when they were assigned to the experimental than to the control sections.

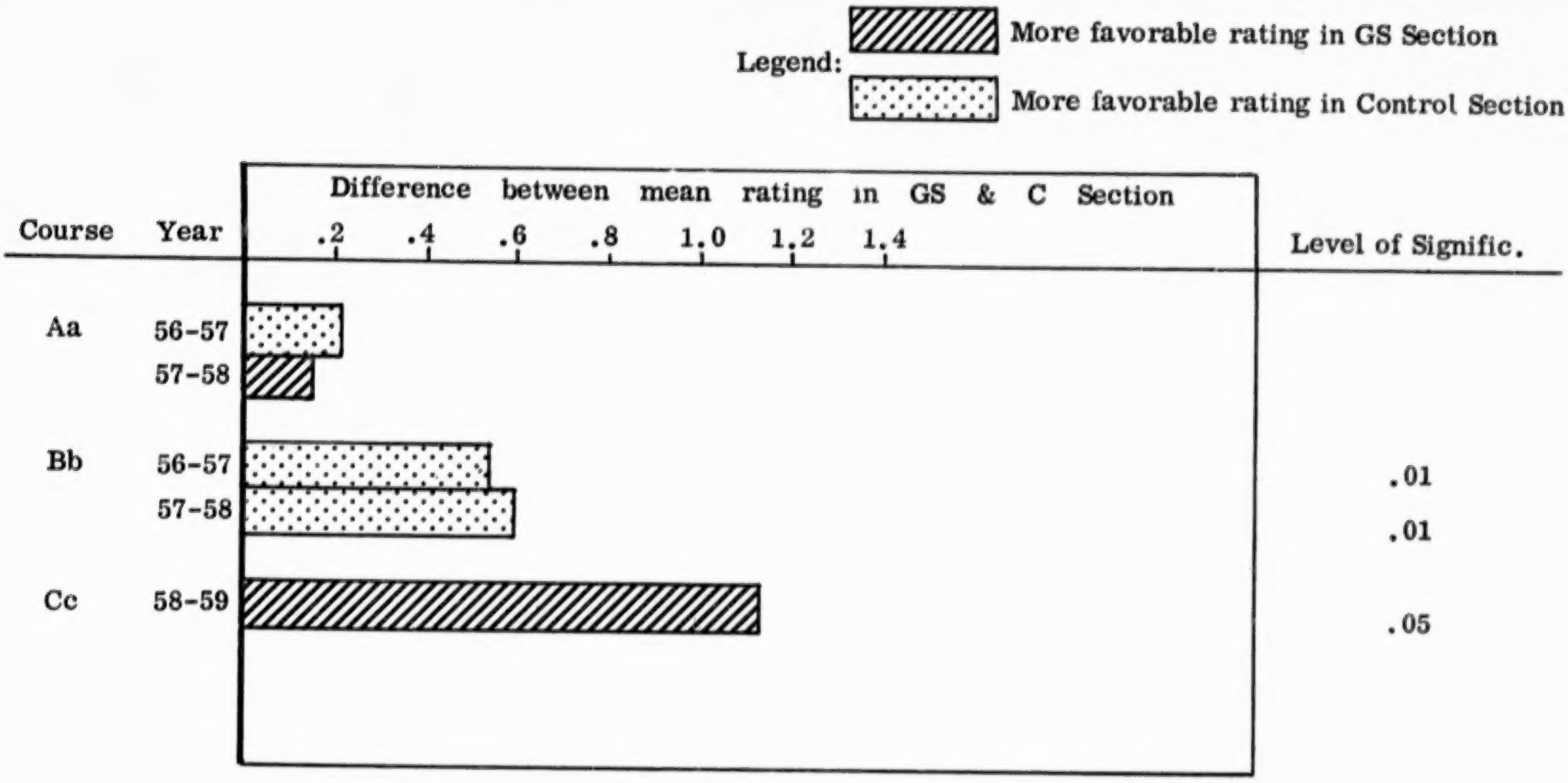
Conclusion—Student attitudes toward the course appeared to be somewhat more dependent upon the instructional procedure itself (*i.e.* whether the section was a TV, LC, GS, or control section) than upon the interaction of instructional procedure in combination with level of student ability.

PROBLEM 8: Student motivation and interest in the course as a function of section assignment.

One of the frequently voiced objections to large class teaching procedures is based upon the belief that students in large sections cannot be as well motivated as students in smaller classes. Large classes are often accused, by virtue of their size, of diminishing student interest and of inhibiting the instructor's ability to whet

Figure 5-3

Summary of Differences Between Mean Ratings of Course by Students in GS and Control Sections



students' appetites for further contacts with the subject-matter area.

The C-Scale contains several items which relate specifically to this matter of student motivation and interest. Five of these items, with which students were asked either to agree or disagree, are:

1. As a result of this course, I have been stimulated to do a good deal of additional reading in the subject area (aside from class assignments).
2. I frequently looked for an excuse to miss one of these classes.
3. Even if I have the chance in the future, I will avoid having anything further to do with this subject.
4. This course did *not* whet my interest in the subject matter.
5. This class is responsible for making me consider a vocation in this subject area.

The percentage of students within the experimental and control sections of TV, LC and GS courses agreeing with each of these statements is reported in *Appendix V-I*. Statistically significant percentage differences are marked in this *Table* with asterisks.

Televised and LC sections seemed, by their very size and impersonality, to encourage a greater number of absences (item 2) than were reported for the control sections. Students in the large (TV and LC) sections and control sections reacted quite similarly, however, to the four other motivational items from the C-Scale.

Students in the GS sections, it is interesting to note, uniformly reported that they were stimulated to a greater extent to do supplemental outside reading than did the students in the sections taught by the regular faculty members. This finding will come as no surprise to readers who have had the good fortune to have been, at one time, a graduate teaching assistant. The expectations of graduate students about the level of performance to be required of undergraduates are notoriously high.

Conclusion—Student motivation and interest in the subject matter is very little diminished by assignment to a TV or LC section rather than to a conventional section. The fact that the number of unexcused absences in TV and LC sections is probably somewhat higher than in control sections (judging from students' own reports) is interesting but should not be dismaying. This finding may reflect a greater amount of coercion for daily attendance in small classes brought about by the high level of visibility of each student, rather than a truly higher level of student motivation in small than in large classes.

GS and control instruction appeared to be about equal with respect to student motivation except for the fact that students in GS sections reported greater stimulation to do supplemental reading.

Thus, according to their opinion, students were as highly motivated in the experimental as in the control conditions. Objections to the experimental procedures which are founded upon a presumed superiority of conventional instruction for evoking student motivation and interest seem, within the scope of this investigation, to be groundless.

ATTITUDES TOWARD THE INSTRUCTOR

Student ratings of instructor effectiveness were obtained on the Instructor Rating Form (I-Scale) described in Chapter III. This scale yields scores

Figure 5-4

Attitude toward course content as a dual function of section assignment and academic ability (1957 - 1958)

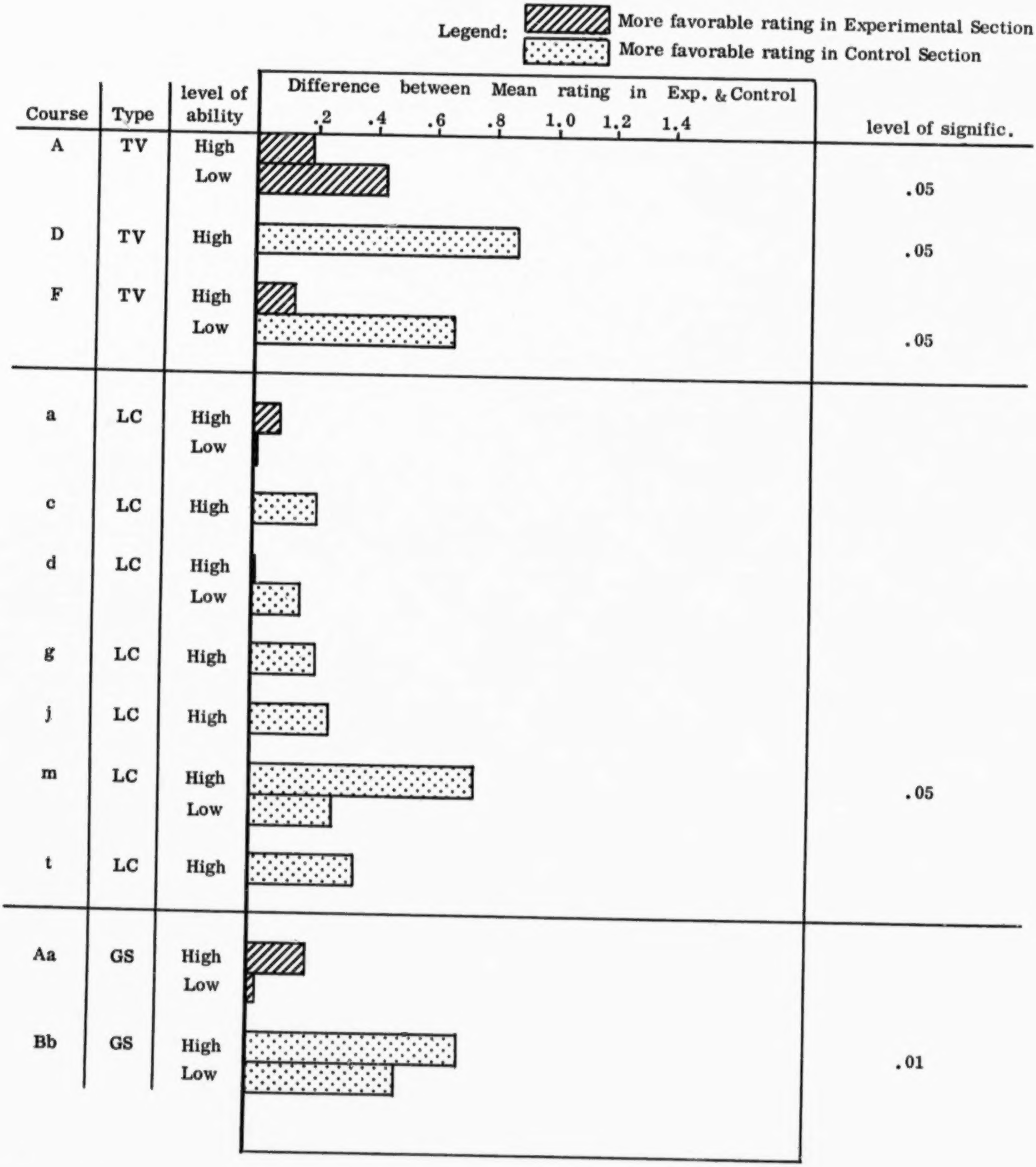
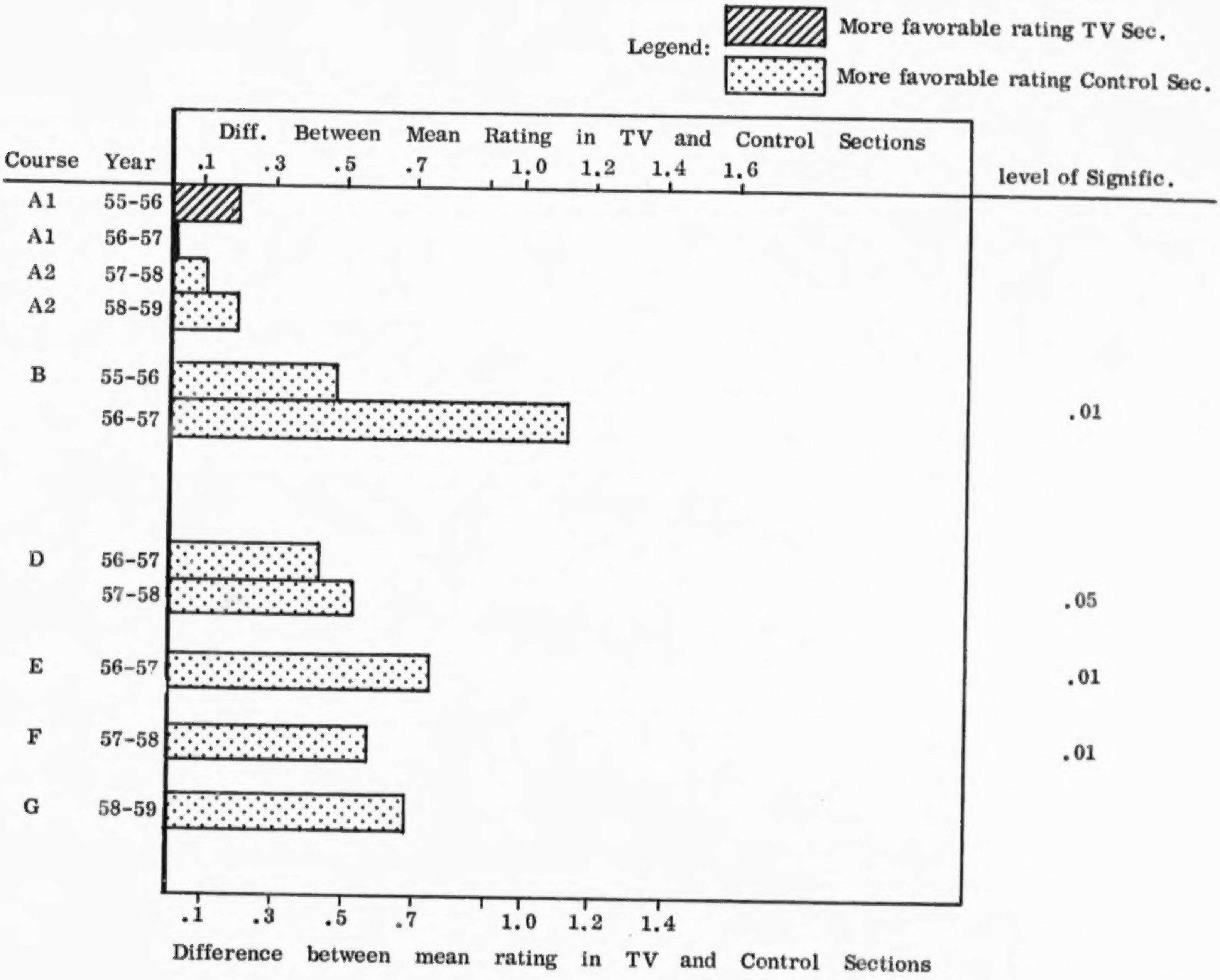


Figure 5-5

Summary of differences between mean rating of the Instructor by Students in the TV and in the Control Sections



ranging from 1.0 (much more effective than the typical instructor) through 5.0 (about as effective as the average teacher) to 9.0 (much less effective than the typical instructor).

The I-Scale was administered to students in both the experimental and control sections of virtually all courses included in the Study. It was generally administered at the same time as the C-Scale.

It is recognized that students are not necessarily the best judges of a teacher's effectiveness, and therefore that ratings by students should not be used for the purpose of making inter-instructor comparisons. Students do, however, observe their instructors closely and are in an excellent position to appraise instructor effectiveness in meeting their needs and desires. Thus any differences that might exist between ratings assigned to the same instructor by his students in the experimental and control sections would be of considerable consequence.

PROBLEM 9: Comparison of student ratings of instructor effectiveness as a function of section assignment.

The results obtained from administration of the I-Scale in the experimental and control sections of various courses are summarized in *Appendix V-II*. These data are shown graphically also in *Figures 5-5, 5-6* and *5-7*. The bar graphs indicate the magnitudes of the differences between the mean I-Scale scores assigned to the instructor by his experimental and control sections, the directions of these differences and, where appropriate, the levels of significance of the obtained differences.

TV Courses—Figure 5-5 shows the mean differences between instructor ratings assigned by students in the TV and control sections of each course.

These data are rather uniformly supportive of greater instructor effec-

Figure 5-6

Summary of Differences Between Mean Ratings of the Instructor by students in the LC and Control Sections

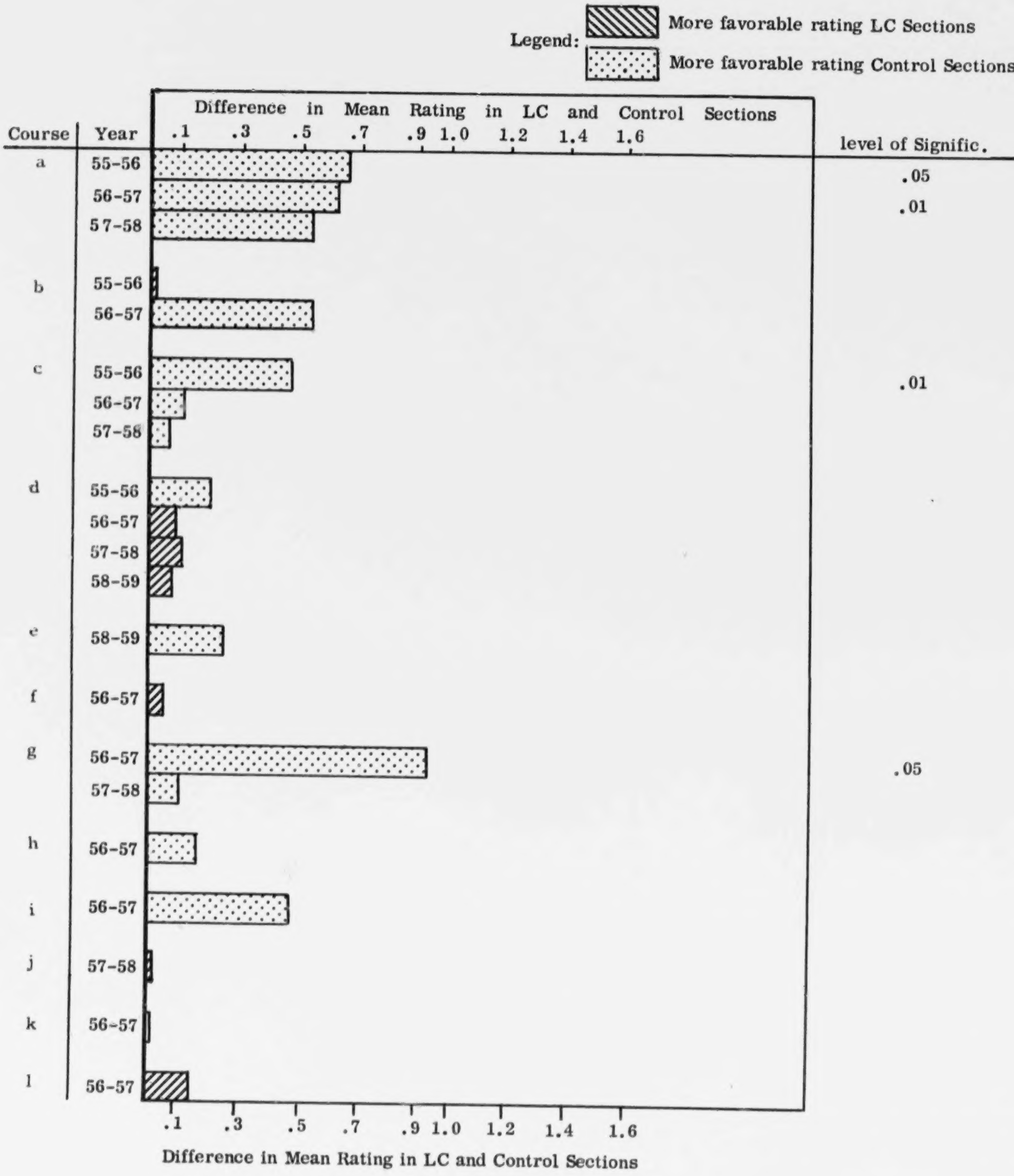
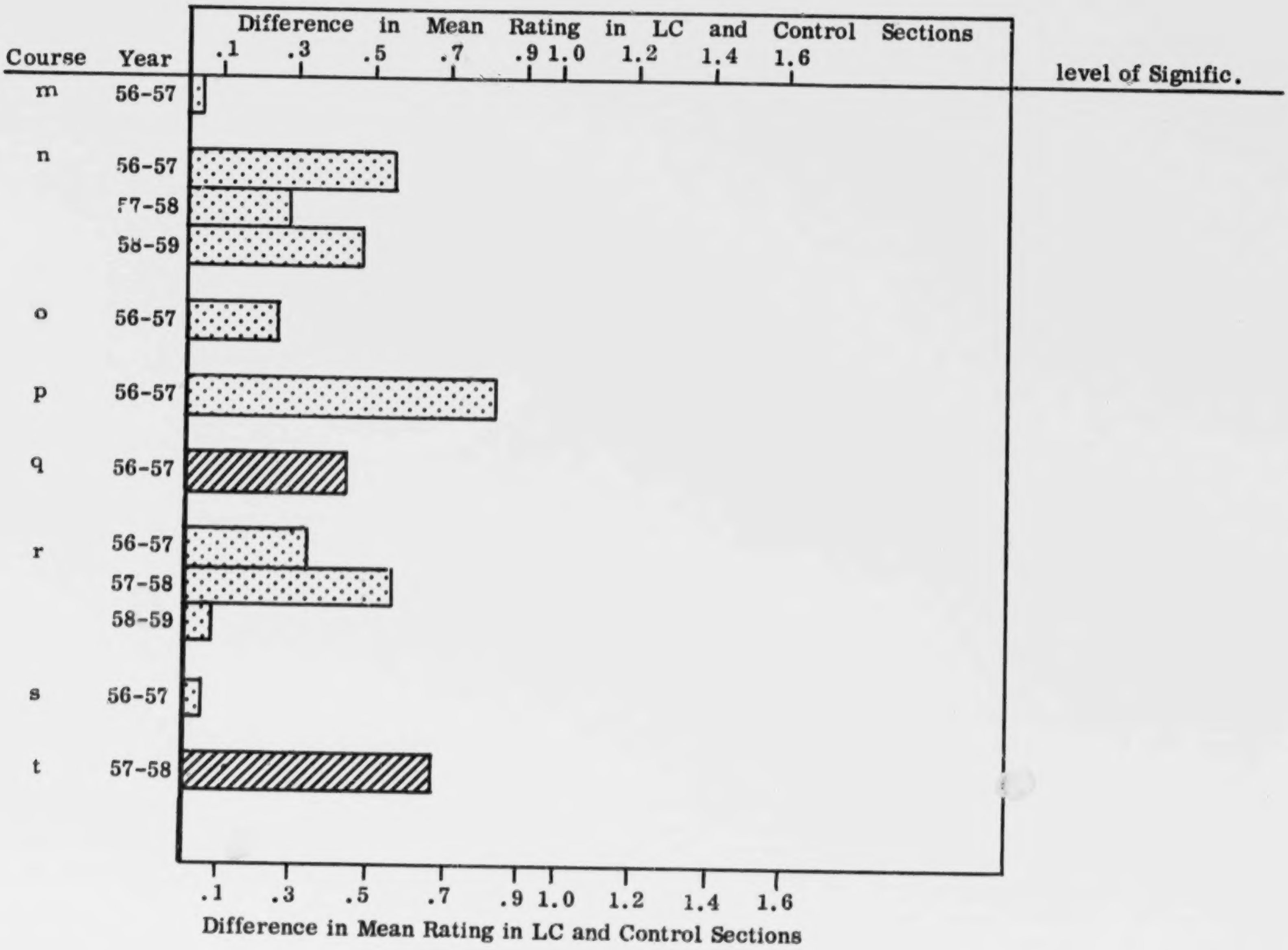


Figure 5-6 cont.



tiveness, as far as student opinions are concerned, in control than TV sections. But not all of the obtained mean differences met the requirement for statistical significance, and the generalization clearly did not hold for the instructor of course *A-1*.

LC Courses—A similar trend toward greater perceived teacher effectiveness in control sections is also evident for the LC-control comparisons shown in *Figure 5-6*.

GS Courses—The comparative instructor ratings are shown for the equated GS and control sections in *Figure 5-7*. Students in the control sections of courses *Aa* and *Bb* consistently rated their instructor (a regular faculty member) more favorably than did the students in the GS sections. The fact that a reversal of this finding occurred in Course *Cc* should not, however, be minimized. Anecdotal evidence seems to indicate that faculty members who have taught Course *Cc* for a period of time become increasingly distressed with the kinds of problems presented by the students enrolled in this course.

Conclusion—The experimental procedures (TV, LC and GS) tended, with few exceptions, to reduce the instructor's effectiveness as far as student opinions were concerned. This perceived reduction in teaching effectiveness was not, it must be remembered, paralleled by a corresponding decrement in the performance of students in the experimental sections on the various measures of achievement.

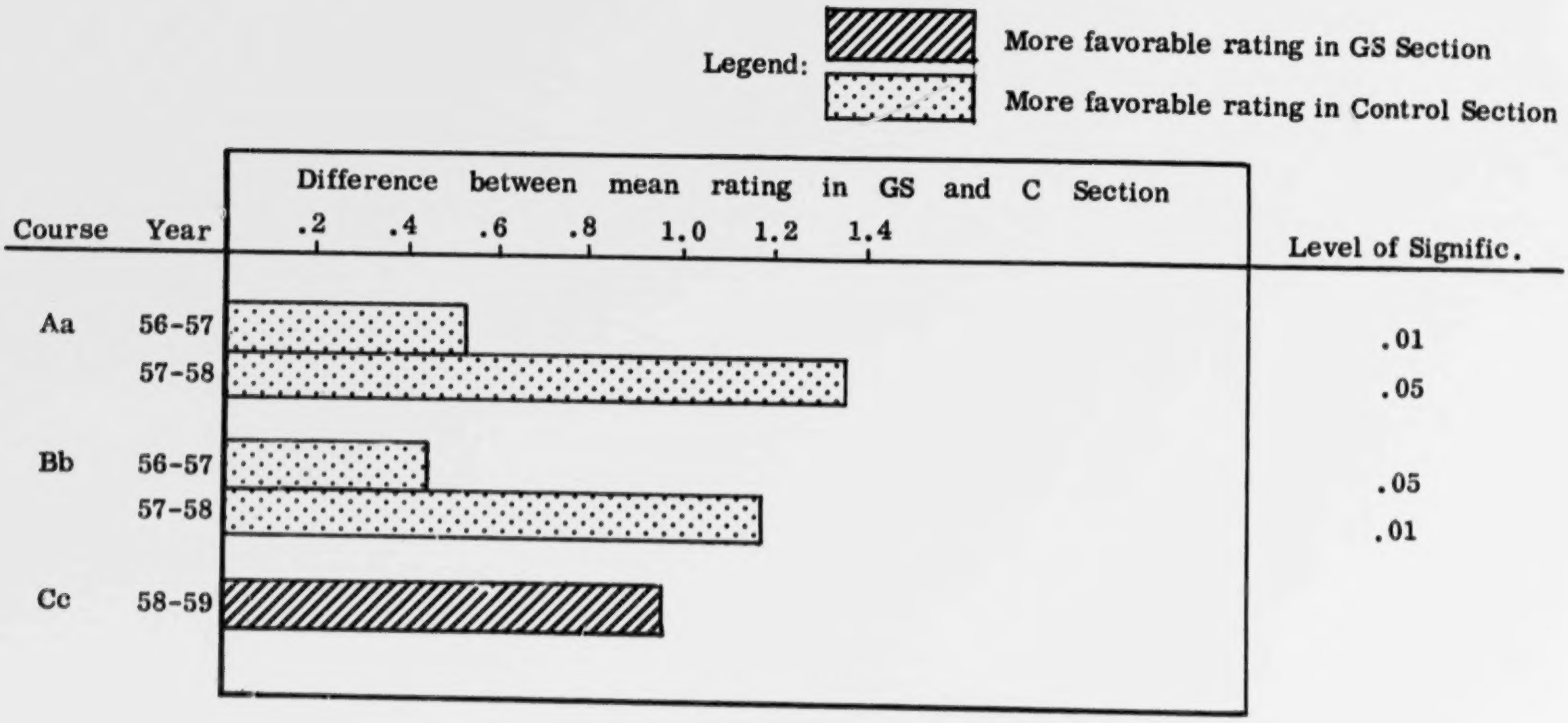
PROBLEM 10: Student ratings of the instructor as a dual function of section assignment and level of ability.

Students in the experimental and control sections of the courses included within the Study during the 1957-1958 academic year were dichotomized into ability subgroups on the basis of ACE total scores. The distributions of instructor ratings assigned by the high (ACE at or above the fiftieth percentile) and low (ACE at or below the forty-ninth percentile) ability subgroups are summarized in *Appendix V-II*. These data are also shown graphically in *Figure 5-8*.

Conclusion—No systematic pattern of interactive effects between section assignment and ability as joint determinants of instructor rating was ap-

Figure 5-7

Summary of Differences Between Mean Ratings of Instructor by Students in GS and Control Sections



parent. Thus student ratings of instructor effectiveness were related to section assignment but not to academic ability.

PROBLEM 11: Effect of instructional procedure upon specific criteria of teaching effectiveness.

Attention is here directed to another of the so-called "intangible" benefits presumed to be inherent in small class instruction. Many teachers expressed the feeling that they were better able to pace their presentations, to maintain student interest, and to encourage student initiative in small classes than in large classes. Consequently the following specific items were extracted from the I-Scale for detailed study.

Item 6. Instructor gives well organized lectures.
Item 7. Instructor makes major points clear.
Item 8. Instructor is enthusiastic in his teaching.
Item 9. Instructor unifies the subject in his lectures.
Item 14. Instructor makes sure students understand difficult points.
Item 15. Instructor paces lecture properly in speed and content to student's comprehension.
Item 16. Instructor holds the interest of more than just the brightest students.
Item 19. Instructor teaches so that student's out-of-class interest is aroused.
Item 24. Instructor encourages initiative on the part of the student.

The students were required to rate their teacher with respect to every item along a five point continuum ranging from A ("outstanding with reference to this item") to E ("among the very worst teachers with respect to this item"). The percentages of favorable (A and B) ratings given to each instructor on the critical items by the students in his experimental and control sections are summarized in *Appendix V-II.* The percentage differences that are statistically significant are marked with asterisks.

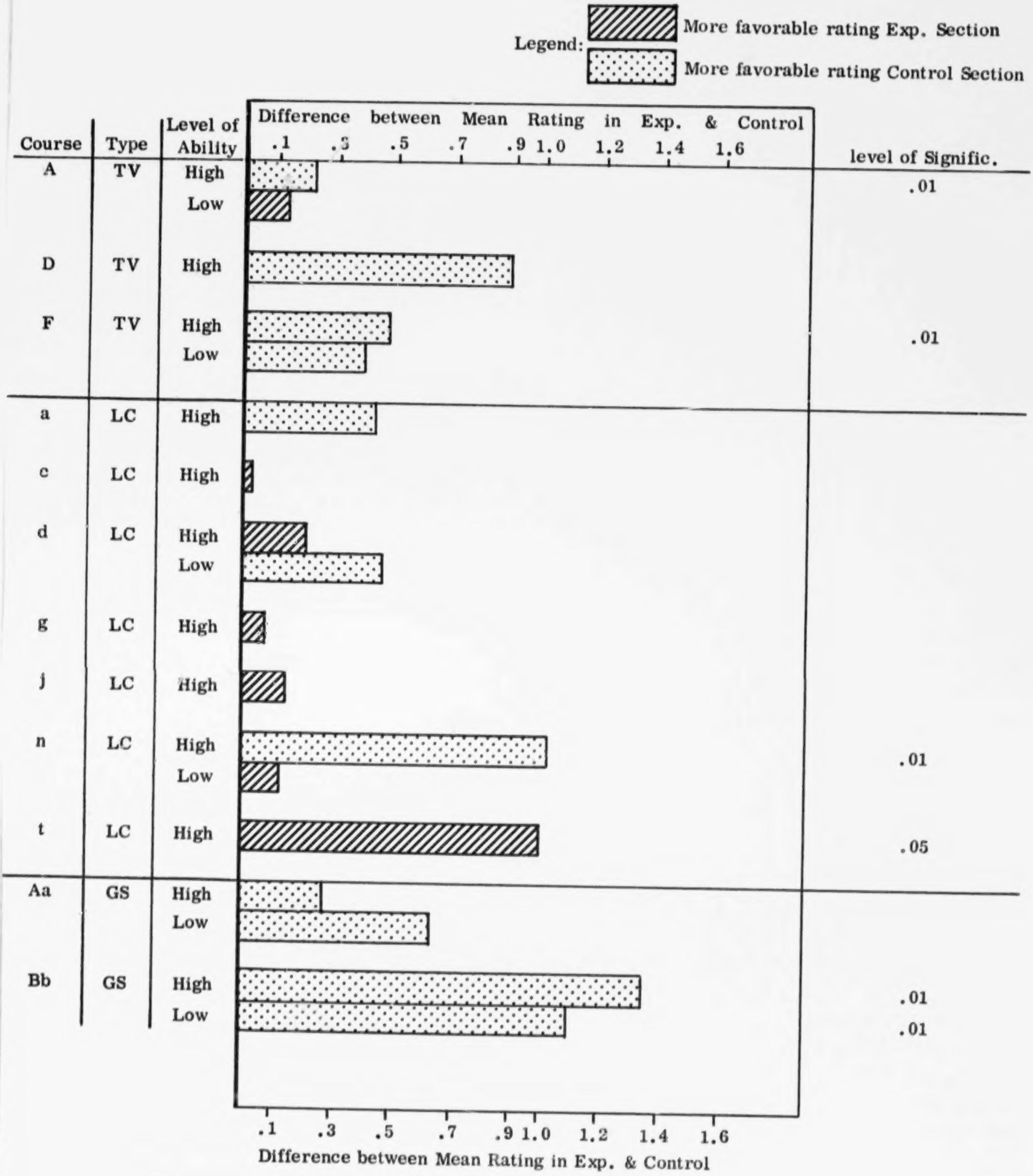
TV and LC Courses—Some of the instructors suspected that large group instruction compelled them to adhere to a better organization of material in their presentations. Two items, numbers 6 and 9, concerned this matter of organization. Student responses to these items generally did not support the instructors' contention that their large group presentations were better organized than their presentations in small classes. Approximately equal percentages of students from the large experimental (LC and TV) sections and equated control sections reacted favorably to these items.

This finding should not be interpreted as meaning that the participating instructors did not, in fact, develop more highly organized courses and presentations by virtue of their participation in the Study. Rather, it is likely that course organization was improved significantly, but that both the experimental and control sections received the benefits of this improved organization. There were, after all, no constraints put upon the instructors to prevent them from transferring any improvements developed for their experimental sections to their control sections. In fact a number of instructors expressed the belief that this improved organization did carry over.

Large group instruction did appear, however, to affect adversely the instructor's ability to make certain that students understood difficult points (item 14), to pace his presentation properly (item 15), to hold the interest of more than the brightest students (item 16), to stimulate students' out-of-class interest (item 19), and to en-

Figure 5-8

Attitude toward Instructor as a Dual Function of Section Assignment and level of ability (1957-1958)



courage student initiative (item 24). A higher percentage of students in the control sections than in the experimental sections tended to respond favorably to these items. The differential between percentage of favorable responses in the experimental and control groups was even more marked for the TV courses than for the LC courses.

GS Courses—The comparative percentages of favorable response to the critical I-Scale items in the GS and control sections quite uniformly favored instruction by regular faculty members over instruction by graduate student assistants.

Conclusion—The students tended to feel that their instructors did a better job of providing individual stimulation and maintaining a high level of interest when they taught control sections than when they taught large sections. The observed differences favoring conventional instruction were even more apparent for the TV-Control comparisons than they were for the LC-Control comparisons.

It is apparent also that students in sections taught by regular faculty members consistently reacted more favorably to the specific I-Scale items under consideration than did the students in sections taught by graduate assistants.

ATTITUDES TOWARD THE EXPERIMENTAL PROCEDURES

A number of studies were conducted which focused upon students' attitudes toward TV and LC instruction *per se* and upon the factors which might be presumed to correlate with these student attitudes. These studies were not comparative in nature since they did not involve analyses of criterion measures administered both to the experimental and control sections. Attitudes and opinions about the experimental procedures were solicited only from those students who were actually enrolled in the experimental sections.

The attitude scales which served as primary evaluative criteria for this sequence of studies were described in Chapter III. These were Thurstone-type scales yielding scores ranging from 1.0 to 9.0 with a neutral point at 5.0. Scores below 5.0 resulted when the students favored large group (either TV or LC) over small group instruction; scores above 5.0 resulted when the students favored small group instruction over either TV or LC instruction.

Additional information about student attitudes was extracted from their written comments solicited at the time they completed the attitude scales and from tape-recorded interviews with groups of students enrolled in a number of the TV and LC courses.

PROBLEM 12: Student attitudes toward TV and LC instruction per se.

The TV and LC scales were administered in the experimental sections of all courses at the end of the first semester and often readministered at the end of the second semester. Both scales required comparisons of the large group procedures against the standard of "conventional" instruction.

TV Compared With Conventional Instruction—*Figure 5-9* summarizes the results obtained from administrations of the TV-Scale.

The graphed portion of this *Figure* shows the mean TV-Scale score obtained each time the scale was administered. Thus in Course *A-1*, the scale was administered three times: at the end of the second semester, 1955-1956, and at the end of each semester, 1956-1957. The mean scores were 4.76, 4.29, and 4.78 respectively. Since all of these means were well below the neutral point (5.0), students in this course uniformly preferred TV over conventional instruction.

The tabular portion of *Figure 5-9* lists the obtained means and standard deviations. These data permit the generalization that students in the TV sections, for the most part, indicated a preference for conventional instruction over TV instruction. The only exceptions to this generalization occurred in courses *A* and *H* and for one semester of Course *F*. These exceptions are worth discussing in greater detail.

The subscripts attached to Course *A* indicate that this course was taught by television by two different instructors. One instructor, *A-1*, taught the course from the inception of the Study through the 1956-1957 academic year. Another instructor *(A-2)* began teaching this course in the 1957-1958 academic year. It is obvious that the change in instructors had some bearing upon student attitudes toward TV instruction. It appears also that the instructor of *A-2* improved his TV teaching technique considerably as a function of experience.

The instructor's importance as a determinant of student attitudes toward televised classes must not be minimized. It is likely, however, that still another factor contributed to the generally favorable reaction in Course *A*. The students enrolled in this course have taken the first step in fulfilling the requirements for a professional commitment. They may therefore be assumed to possess a relatively high degree of motivation and interest in the subject matter and in the actual technique of presentation. It is believed that this fact, combined with an instructional approach specifically designed to capitalize upon certain of the unique strengths of instructional TV, produced the favorable student attitudes for Course *A*.

Student attitudes toward TV classes in comparison with conventional classes were favorable (or minimally unfavorable) also in Courses *F* and *H*. Both of these courses were taught by the same instructor. Thus it appears once again that the instructor may, himself, be a prime determinant of student reaction to TV instruction. Additional data bearing specifically upon this relationship is presented later. It is sufficient here to indicate merely that although students in most TV sections expressed a clear preference for conventional over TV instruction, it was found possible by three instructors to teach TV sections in such a way that the students either felt that there was not really much difference between TV and conventional instruction, or that TV was superior to conventional instruction.

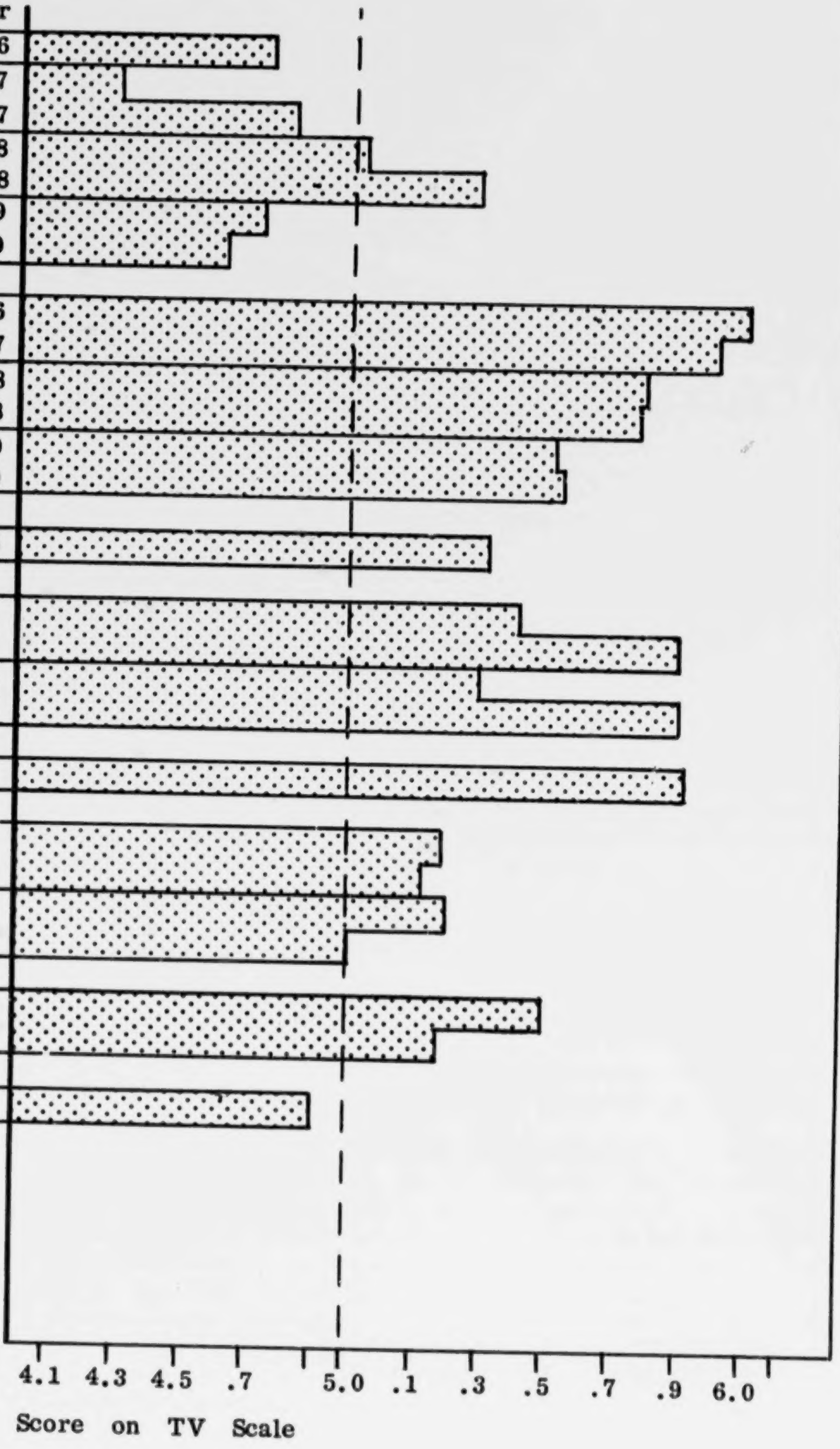
LC Compared With Conventional Instruction—The data obtained from administrations of the LC-Scale are summarized in *Figure 5-10*.

Although there is considerable variability from course to course in the extent to which students in LC sections indicated a preference for small class instruction, the data in *Figure 5-10* are remarkably consistent. Students in general preferred conventional instruction to LC instruction.

The progressively more favorable attitudes in Course *N* as the instructor gained experience in teaching large sections was not an accidental occurrence. Here again is an instance wherein desired changes in student attitudes paralled the instructor's concerted efforts to overcome certain of the problems unique to large group instruction

Figure 5-9

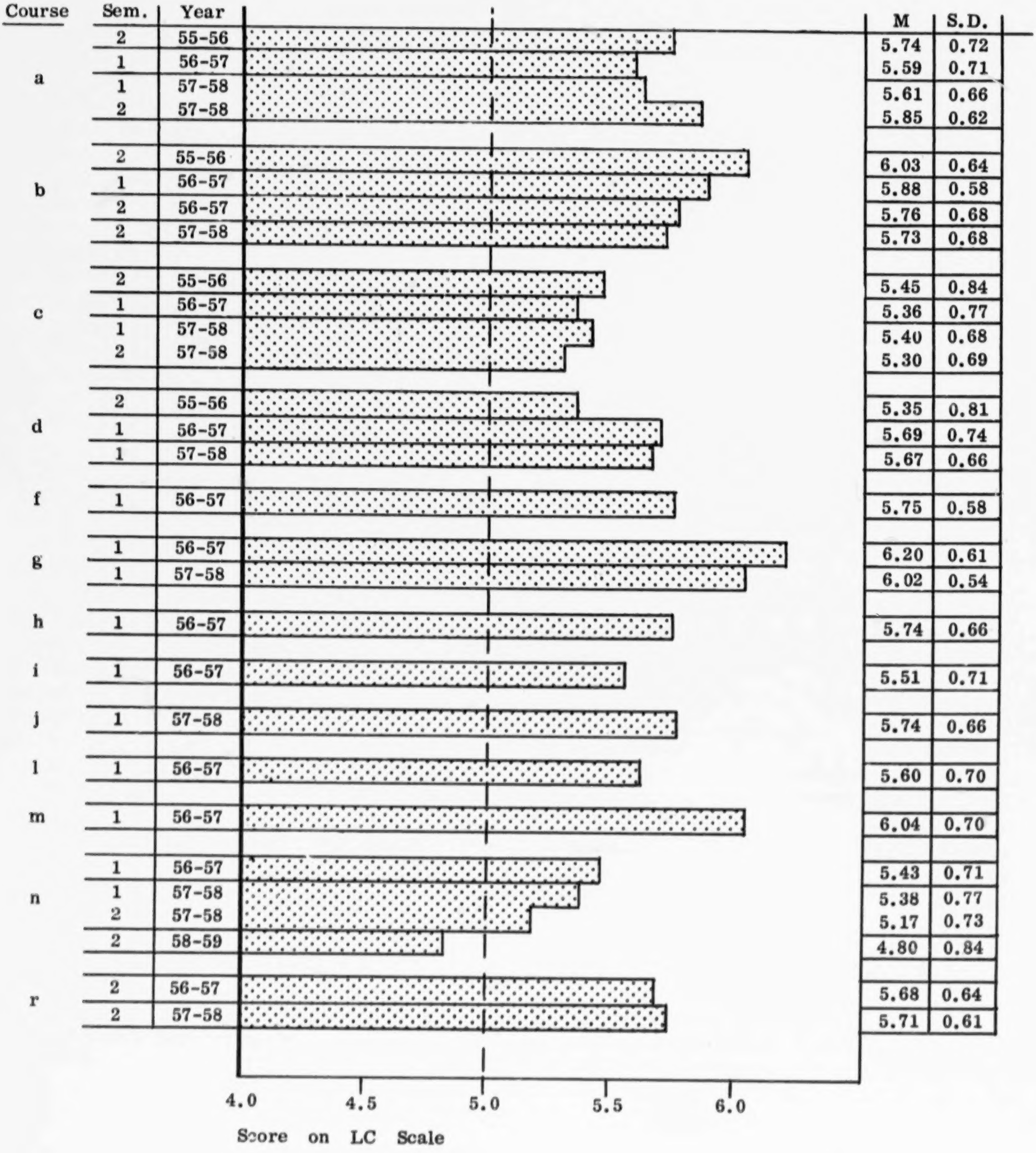
Summary of Students' Attitudes Toward TV Compared to Conventional Instruction



Course	Sem.	Year	M	S.D.
A1	2	55-56	4.76	0.94
A1	1	56-57	4.29	0.87
	2	56-57	4.78	0.90
A2	1	57-58	5.14	0.95
	2	57-58	5.36	0.93
A2	1	58-59	4.73	0.97
	2	58-59	4.63	1.30
B	2	55-56	6.19	0.81
	1	56-57	6.08	0.79
	1	57-58	5.87	0.88
	2	57-58	5.85	0.81
	1	58-59	5.63	0.85
	2	58-59	5.65	0.99
C	2	55-56	5.42	0.99
D	1	56-57	5.53	1.10
	2	56-57	5.98	0.88
	1	57-58	5.42	0.86
	2	57-58	5.91	0.95
E	1	56-57	5.93	0.97
F	1	57-58	5.30	0.89
	2	57-58	5.25	1.01
	1	58-59	5.30	0.76
	2	58-59	5.00	0.88
G	1	58-59	5.62	0.76
	2	58-59	5.27	0.59
H	2	55-56	4.91	0.83

Figure 5-10

Summary of Student Attitudes toward LC Compared to Conventional Instruction



Course	Sem.	Year	M	S.D.
a	2	55-56	5.74	0.72
	1	56-57	5.59	0.71
	1	57-58	5.61	0.66
	2	57-58	5.85	0.62
b	2	55-56	6.03	0.64
	1	56-57	5.88	0.58
	2	56-57	5.76	0.68
	2	57-58	5.73	0.68
c	2	55-56	5.45	0.84
	1	56-57	5.36	0.77
	1	57-58	5.40	0.68
	2	57-58	5.30	0.69
d	2	55-56	5.35	0.81
	1	56-57	5.69	0.74
	1	57-58	5.67	0.66
f	1	56-57	5.75	0.58
g	1	56-57	6.20	0.61
	1	57-58	6.02	0.54
h	1	56-57	5.74	0.66
i	1	56-57	5.51	0.71
j	1	57-58	5.74	0.66
l	1	56-57	5.60	0.70
m	1	56-57	6.04	0.70
n	1	56-57	5.43	0.71
	1	57-58	5.38	0.77
	2	57-58	5.17	0.73
	2	58-59	4.80	0.84
r	2	56-57	5.68	0.64
	2	57-58	5.71	0.61

He utilized ingenious visuals (making excellent use of the Vu-Graph) and developed student involvement by developing a problem approach to the subject matter. The students did library investigations on these problems in small groups and reported the results of their investigations to the entire class. In addition, a special weekly seminar was arranged for highly motivated and capable students enrolled in this course.

TV Compared With LC Instruction—Although students generally indicated a preference for small group instruction over TV and LC instruction, the comparison may be a trifle unrealistic in view of the anticipated increases in University enrollments. The practical administrative decision in certain courses very likely will involve a choice between televised and large untelevised classes rather than between TV (or large classes) on the one hand and small classes on the other.

One of the courses in the Study was scheduled to permit the students to experience both TV and LC instruction in the same subject matter and from the same instructor. After receiving a full semester of each kind of instruction, these students completed the TV-LC scale. This scale requires the respondents to compare TV instruction with LC rather than with small class instruction.

Since this comparison involved only one course, the data are not presented in this Report. It was apparent, however, that students in this course were equally unfavorable to TV instruction when it was compared with LC instruction as they were when TV instruction was compared with small-class instruction.

This pattern of preference was not uniformly supported by the comments of students in other TV courses. TV was generally perceived as preferable to LC instruction in those courses wherein visual materials and demonstrations were often displayed. Students in the science courses, particularly, felt that given a choice between LC and TV instruction, they would choose the latter.

Conclusion—Students in most courses preferred small classes both to large classes and to TV classes. Occasional exceptions to this generalization were noted, but they did not occur with sufficient frequency to invalidate this as a general conclusion.

The attitudes of students about TV compared with LC (rather than small) classes were more variable. TV classes were preferred to large classes whenever frequent use of visuals and demonstrations was an integral part of the course. Conversely, if the presentations consisted primarily of lectures with little use made of visual materials, the students tended to prefer LC over TV instruction.

PROBLEM 13: Student attitudes as a function of academic ability.

The purpose of this series of analyses was to determine whether or not a differential pattern of attitude toward TV and LC classes existed for high and low ability students. Accordingly, the students in each course were dichotomized on the basis of ACE total score, and the mean TV-Scale and LC-Scale scores for the ability subgroups were compared. High ability was defined by an ACE score at or above the sixty-fifth percentile; low ability by an ACE score at or below the thirty-fifth percentile.

TV Attitudes by Ability Subgroup—The data for these analyses performed in the TV courses are exhibited in *Figure 5-11*.

The graphic portion of this *Figure* shows the mean score on the TV-scale of the high and low ability students enrolled in each course. The tabular portion of the *Figure* summarizes other pertinent data about the distributions of TV-Scale scores and the t-ratios for each comparison between high and low ability subgroup means. Thus in Course *A-1*, the TV-Scale administered at the end of the first semester, 1956-1957, yielded a mean for high ability students of 4.27 and a mean for the low ability students of 4.48. The difference between these means is not statistically significant since the t-ratio for this comparison was only 1.05.

The data in *Figure 5-11* exhibit a pattern supporting the conclusion that high ability students in certain courses were somewhat more inclined toward unfavorable attitudes toward TV (in comparison with conventional) instruction than were low ability students. This pattern is particularly evident in Courses *B* and *F*. Both of these were science courses relying heavily upon visualization as an integral part of the TV presentations.

The data for the remaining TV courses are variable. One of the comparisons for Course *D* even produced a significantly less unfavorable attitude by high than by low ability students.

LC Attitudes by Ability Subgroup—Comparative LC-Scale scores for the high and low ability subgroups in each course are summarized in *Figure 5-12*.

No consistent pattern of differential attitudes toward LC in comparison with small class instruction is apparent for the subgroups by ability.

Conclusion—There was some indication that TV instruction was more acceptable to low ability students than to high ability students in those courses wherein visuals of various kinds comprised a significant portion of the presentations. As a general rule, however, high and low ability students held essentially similar attitudes toward large group instruction in comparison with conventional instruction.

PROBLEM 14: Specific strengths and weaknesses of TV and LC instruction.

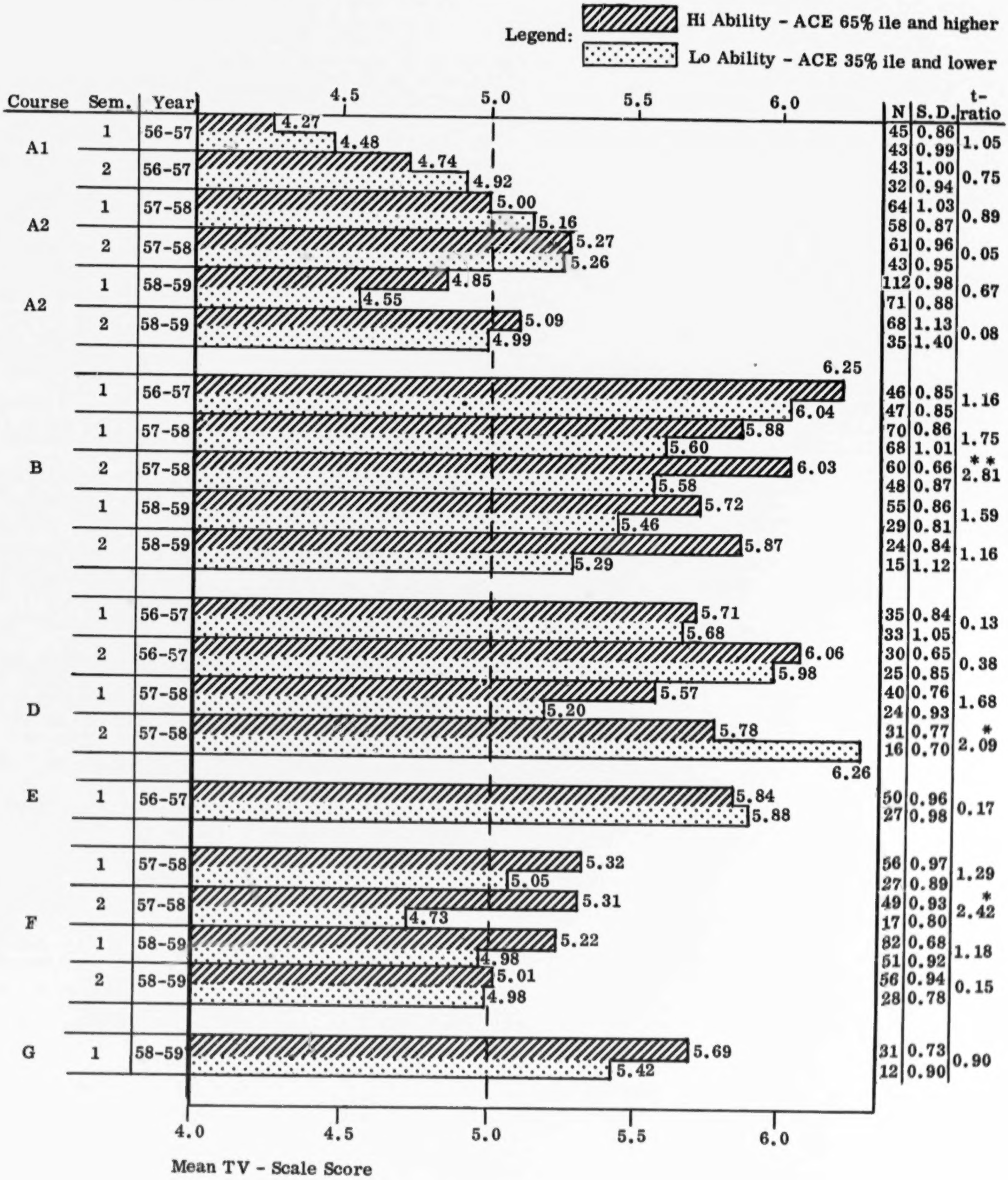
The data thus far presented have dealt with generalities. Even though the prevailing attitude toward the experimental modes of instruction in contrast to small class instruction was negative, there were some students in every course who preferred TV (or LC) instruction. And many of the students who reacted unfavorably to LC and TV instruction did perceive certain strengths in these procedures. A diagnostic study of some of the strengths and weaknesses was conducted in the hope that it would facilitate the improvement of large group teaching procedures.

One of the most interesting features of this aspect of the research is that it clearly demonstrated that one man's meat is another's poison. The very features of TV and LC instruction regarded as the most serious deficiencies by some students were regarded by others as major virtues! The ensuing discussion of the relative strengths and weaknesses of TV and LC instruction is based upon item analyses of student attitude scale responses, written comments, and several tape-recorded interviews.

Students tended to feel that TV and large class instruction require a more careful job of presentation by the instructor than is generally the case in small classes. Although the limitation put upon classroom discussions by large group teaching procedures was generally regarded as a serious loss, many students commented

Figure 5-11

Attitude toward TV Classes as a Function of Academic Ability

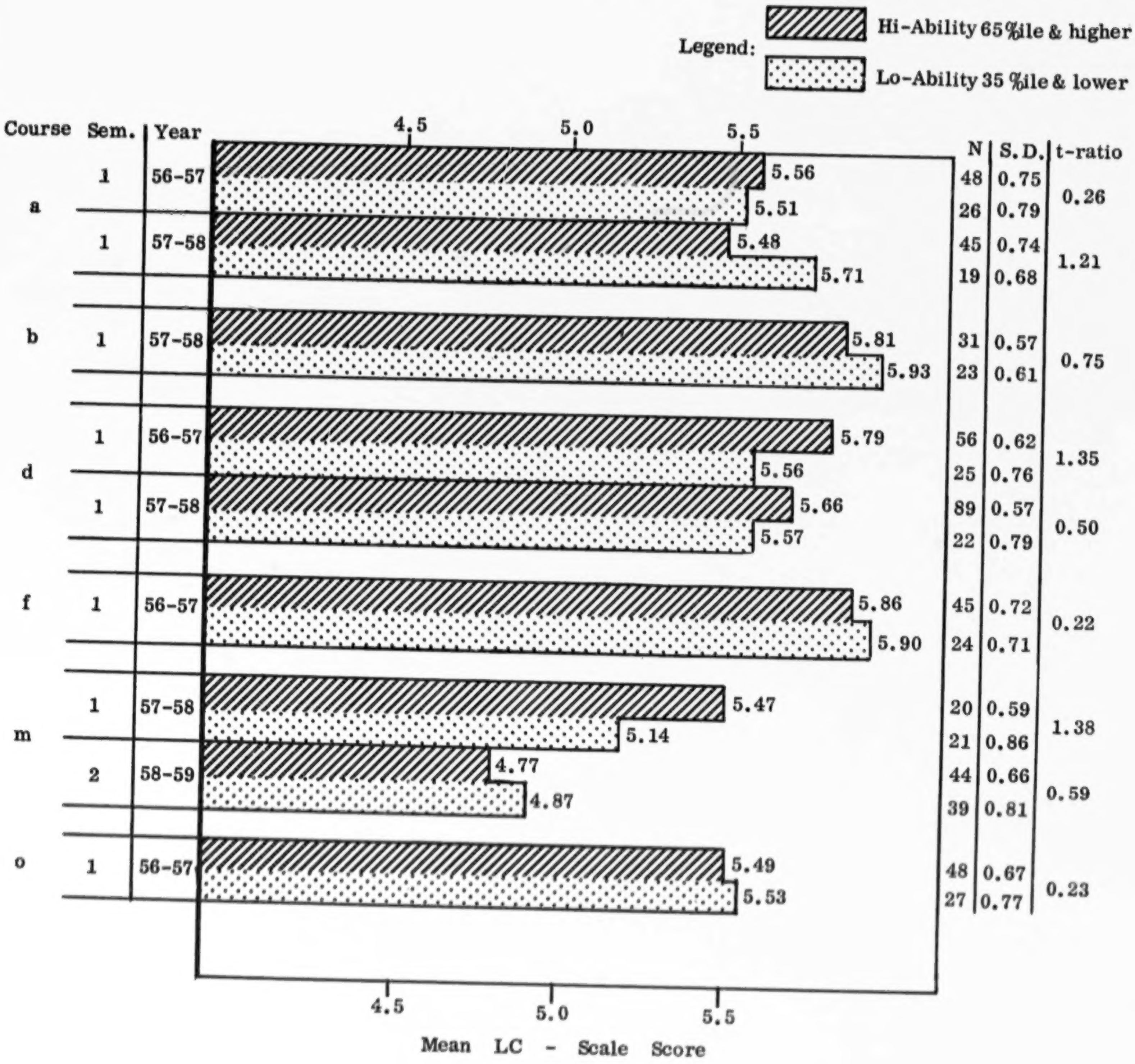


* P< .05

* * P< .01

Figure 5-12

Attitude toward LC Instruction as a function of Academic Ability



that they enjoyed the fact that classes were not bogged down by uninteresting or tangential discussions. An additional strength of TV (but not LC) classes was the rather obvious increase in use of visual aids.

On the debit side of the ledger, students were most vociferous about diminished contact with their instructor, particularly in TV courses. Many students claimed that the lack of personal recognition led to diminished motivation for study. Unfortunately, the proctors in the TV viewing rooms were unsuccessful in compensating for the instructor's absence.

Students in both TV and LC courses objected to the inability to raise questions *as they occur* during the class hour. The untimeliness of questions postponed until special discussion periods was particularly distressing to students in TV courses.

A variety of comments by students in both TV and LC courses concerned ineffective teaching techniques of individual instructors. Poor use of the blackboard, incorrect pacing of presentations, over-use of straight lecture, and lack of organization seem to be criticisms of the instructor which the students then generalize to TV and LC classroom procedures.

Students were somewhat more outspoken in criticism of TV courses than of LC courses. This is probably due, in part, to the novelty of televised classes, and in part to poor communication of the reasons for teaching TV courses. A number of students perceived the real reason as a plot whereby the University expects to cut costs and increase profits at the expense of adequate instruction.

Certain of the student criticisms of large group instruction were taken seriously by the instructors who, in turn, made some rather deliberate attempts to remedy the perceived deficiencies. The extent to which these attempts to improve instructional quality were successful was investigated in three of the TV courses. Students in these courses were required to complete the TV Opinionnaire (described below) at the end of the 1957-1958 and 1958-1959 academic years. A comparison of the responses to some of the items in this Opinionnaire at the end of each of these years indicates the kind of changes in student opinions that are possible as a result of instructor concern for this matter.

The TV Opinionnaire was designed simply to obtain expressions from students in the TV classes about some of the specific aspects of TV instruction that might need improvement. The students were asked to rate each of the following statements along a five-point continuum ranging from A ("outstanding") to E ("completely unsatisfactory").

28. Presentation of material in a way that helps you take a good set of classroom notes.
30. Your comprehension and understanding of the material that the instructor is attempting to teach.
31. Provision of opportunities for raising questions and making comments in the course.
32. The extent to which you feel free to consult with your TV instructor *outside of class* (in his office).
33. Presentation of new material at a rate which is not too fast to prevent comprehension.
34. Presentation of new material at a rate which is not too slow to maintain your interest.
35. The organization of material presented during the class hour.
36. The use of visual aids.

TABLE 2

Percent of favorable responses to specific items about TV as a means of instruction.

		% of favorable responses to item:							
Course	*Year*	28	30	31	32	33	34	35	36
A	57-58	68%	65%	35%	46%	62%	45%	64%	78%
	58-59	83	75	32	41	83	56	71	80
B	57-58	39	34	09	26	43	35	52	77
	58-59	55	39	15	37	55	53	66	88
F	57-58	78	46	02	22	52	64	81	64
	58-59	92	70	06	38	70	75	97	86

The percentages of favorable ratings ("outstanding" or "quite satisfactory") given to these statements by students during the two successive years are summarized in *Table 2.*

It appears from these data that student opinions about TV instruction are amenable to a certain amount of change in the desired direction.

PROBLEM 15: Change in attitudes about large group instruction from beginning to end of the course (or semester).

A four-item multiple-choice opinionnaire was administered to students in some of the experimental sections at the beginning of the year and again at the end of a full semester. The same opinionnaire was readministered also at the end of the second semester in two of the TV courses. The lead statements for each of the items in the original administration are given below. (Verb tense was changed for readministration at the end of the semester.)

1. Do you think you will *learn* as much by means of TV (LC) instruction as you would have learned in a conventional (small) class?
2. How well do you think this class will hold your *attention* compared to a conventional (small) class?
3. Aside from class meetings, how much *personal-individual contact* do you feel you will have with this instructor compared to the contact if he were teaching a conventional (small) class?
4. How well prepared (reading textbook assigments, studying notes, etc.) do you feel you will be for each class meeting compared to what your preparation would have been for a conventional (small) class?

The alternatives accompanying each of these four leads were scaled (Thurstone procedure) and demonstrated to be equidistantly spaced. This fact permitted computation of a scale value for the median response to every item. These values are summarized for the TV courses in *Table 3.*

Table 3 is to be read as follows: The median response to the"learning" item administered at the beginning of the second semester, 1955-1956, in Course *A* was 3.16. This is indicative of a favorable attitude (*i.e.* below 5.0). These students believed that they would learn considerably more from the course by virtue of assignment to the TV than to the conventional section. These students still responded favorably to this item at the end of the semester (median response 3.93). The end-of-semester responses were, however, significantly less favorable than the beginning-of-semester responses (since the chi square is statistically significant).

Some data of this kind were accumulated also for LC courses and are presented in *Table 4.*

TABLE 3

Student Responses to Opinionnaire Items at the Beginning and End of the Semester in TV Courses

			Item							
			1. "Learning"		*2. "Attention"*		*3. "Instr. Contact"*		*4. "Preparation"*	
Course	*Year*	*Time Tested*	*Median§*	*Chi Square*	*Median§*	*Chi Square*	*Median§*	*Chi Square*	*Median§*	*Chi Square*
A	55-56	Beg. 2d Sem.	3.16	12.42**	3.22	7.08	6.43	0.26	4.54	5.70
		End 2d Sem.	3.93		4.16		6.58		5.05	
	56-57	Beg. 1st Sem.	3.76	6.46	3.66	4.94	5.66	12.36**	4.71	5.62
		End 1st Sem.	3.38	12.86*	3.21	14.00**	6.54	0.98	4.90	8.04*
		End 2d Sem.	4.30		4.18		6.66		5.41	
B	55-56	Beg. 2d Sem.	3.95	15.02**	3.75	26.28**	5.26	2.80	4.64	24.90**
		End 2d Sem.	5.47		6.28		5.47		5.71	
	56-57	Beg. 1st Sem.	6.76	8.30	6.38	4.48	6.58	4.50	5.70	24.66**
		End 1st Sem.	6.84		6.68		6.78		7.00	
C	55-56	Beg. 2d Sem.	6.18	5.22	5.11	19.94**	6.29	2.38	4.98	26.10**
		End 2d Sem.	6.70		6.78		6.64		6.68	
D	56-57	Beg. 1st Sem.	5.56	15.42**	4.48	17.46**	6.72	0.86	5.02	33.10**
		End 1st Sem.	5.75	5.84	6.07	4.32	6.74	0.48	6.46	6.00*
		End 2d Sem.	6.42		6.50		6.80		6.94	
E	56-57	Beg. 1st Sem.	6.44	21.38**	5.80	14.16**	6.52	10.08*	5.74	22.88**
		End 1st Sem.	7.59		6.98		6.88		6.97	
H	55-56	Beg. 2d Sem.	5.25	3.54	3.79	9.52*	6.51	3.02	5.27	3.04
		End 2d Sem.	4.91		4.47		6.66		5.58	

§5.0 is "neutral," Medians below 5.0 are favorable to TV classes; those above 5.0 are favorable to small classes.
*p < .05
**p < .01

TABLE 4

Student Responses to Opinionnaire Items at the Beginning and End of the Semester in LC Courses

			Item							
			1. "Learning"		*2. "Attention"*		*3. "Instr. Contact"*		*4. "Preparation"*	
Course	*Year*	*Time Tested*	*Median§*	*Chi Square*	*Median§*	*Chi Square*	*Median§*	*Chi Square*	*Median§*	*Chi Square*
a	56-57	Beg. 1st Sem.	5.50	8.02	5.10	8.46	6.12	2.56	5.19	0.10
		End 1st Sem.	5.68		5.71		5.80		5.21	
b	56-57	Beg. 1st Sem.	6.35	9.96*	6.52	8.58	5.92	7.10*	5.45	1.54
		End 1st Sem.	6.58		6.70		6.40		5.50	
f	56-57	Beg. 1st Sem.	6.03	5.94	5.10	5.82	6.24	0.44	5.48	8.68*
		End 1st Sem.	5.86		5.56		6.28		6.32	
s	56-57	Beg. 1st Sem.	6.03	5.94	5.10	5.82	6.24	0.44	5.48	8.68*
		End 1st Sem.	5.86		5.56		6.28		6.32	

§Medians below 5.0 are favorable to LC classes; those above 5.0 are favorable to small classes.
*p < .05

Conclusion—There was less change in students' opinions from the beginning to the end of the semester in LC sections than in TV sections. The prevailing tendency for students in the TV courses was one of "progressive disenchantment." Their attitudes at the end of the semester were often less favorable than those held at the beginning of the semester.

It is important to note, however, that evidence for "progressive disenchantment" in TV sections was accumulated during the initial years of the Study. Data similar to those in *Table 3* were not obtained for the 1957-1958 and 1958-1959 academic years. There is, however, some evidence that the trend toward disenchantment in TV courses may have been reversed during 1958-1959. The TV-Scale means obtained at the end of each semester of this year (see *Figure 5-10*) give evidence of more favorable student attitudes at the end of the second semester than at the end of the first semester!

PROBLEM 16: The relationship between student attitudes about TV and LC instruction and their attitudes toward their instructors.

It is apparent from student comments that one of the factors contributing most heavily to the success or failure of TV and LC courses is the instructor. The manner in which he makes his presentation, the extent to which he utilizes special facilities (including visual aids and demonstrations), and the degree to which he "comes through to his class" flavor student attitudes about being in a TV or LC section.

The extent of the relationship between student attitudes about the effectiveness of the instructor and the attitudes toward TV and LC classes is evident from the correlations exhibited in *Table 5*.

All of the statistically significant correlations in *Table 5* are positive: *i.e.*, favorable ratings of the instructor are associated with favorable attitudes toward TV and LC instruction. Although relatively low (not significant) correlations were obtained in a number of LC courses, the general trend toward association of the two variables under consideration is quite evident even though there may be some argument about which is cause and which is effect.

The importance of the instructor as a determinant not only of student attitudes but also of student expressions of subsequent enrollment in TV and LC sections was demonstrated by replies to the following two items included in the TV and LC Scales.

1. You may have the option next semester of enrolling in either a TV (LC) section or a conventional section of a particular course. If both sections are taught by the same instructor (whom you like) and are given at desirable hours, which fit in with your schedule, which section will you choose?
2. You may have the option next semester of enrolling in either a TV (large) class section or a conventional (small) class section of a particular course. Suppose the TV

TABLE 5

Correlations Between I-Scale Responses and Attitude Toward Experimental Types of Instruction (1956-1957)

Course	*Type*	*r*
A	TV	.39••
B	TV	.43••
D	TV	.34••
E	TV	.33••
a	LC	.32••
b	LC	.18
d	LC	.38••
f	LC	.43••
g	LC	.38••
h	LC	.00
l	LC	.20
m	LC	.26
n	LC	.37•
o	LC	.33••
p	LC	.11
q	LC	.21
r	LC	.01
s	LC	.18

•r exceeds 1.96 times standard error of r of .00 ($p < .05$)

••r exceeds 2.58 times standard error of r of .00 ($p < .01$)

TABLE 6

Verbal Preference for TV Sections

Course	*Year*	*Percent choosing TV section rather than conventional section*			
		When Instructor is Constant		*When Instructor is Varied*	
		1st Semester	*2nd Semester*	*1st Semester*	*2nd Semester*
A_1	55-56		51		84
	56-57	79	48	97	92
A_2	57-58	38	21	92	87
	58-59		39		88
B	55-56		22		74
	56-57	16		62	
	57-58	14	14	67	46
	58-59		23		57
C	55-56		21		83
D	56-57	44	22	76	63
	57-58	29	11	84	65
E	56-57		04		43
F	57-58	29	26	80	59
	58-59		40		73
G	58-59		12		60
H	55-56		33		93

(large) section is to be taught by an instructor who has the reputation of being an excellent teacher, whereas you will have to take your chances on instructor assignment in the conventional (small) section. Which section will you choose?

The responses to these items are summarized in *Tables 6* and *7*.

Conclusion—The instructor is, himself, a major determinant of student reaction to TV and LC classes. The correlations between student ratings of instructor effectiveness and the ratings of TV and LC classes are positive. Furthermore, the majority of students indicated a desire to enroll in TV and LC sections if they were assured thereby that they would be taught by an instructor who has the reputation of being an excellent teacher.

TABLE 7

Verbal Preference for LC Sections

Course	*Year*	*Percent choosing LC section rather than conventional section*			
		When Instructor is Constant		*When Instructor is Varied*	
		1st Semester	*2nd Semester*	*1st Semester*	*2nd Semester*
a	55-56		28		87
	56-57	31		85	
	57-58	30	16	89	83
b[†]	55-56		16		84
	56-57	12	31	75	91
	57-58		20		86
c	55-56		32		90
	56-57	44		84	
	57-58	42	47	95	87
d	55-56		44		86
	56-57	29		81	
	57-58	24		82	
f	56-57	18	12	79	75
g	56-57	15	06	57	63
	57-58	19		79	
h	56-57	10		88	
i	56-57	21		92	
j	57-58	26		92	
k	56-57	09		79	
l	56-57	24		70	
m	56-57	12		72	
n	56-57	31		85	
	57-58	37	48	89	93
	58-59		27		86
o	56-57	41		85	
	57-58	38	34	91	95
r[†]	56-57		30		87
	57-58		24		90
s	56-57		18		84
t	57-58	24	16	83	82

[†] a one semester course

PROBLEM 17: The relationship between student attitudes toward large group instruction and measured personality variables.

A pilot study was conducted in 1957-1958 to ascertain whether certain personality variables were related to student attitudes about TV and LC instruction. The Edwards Personal Preference Schedule (PPS) was administered to samples of students in the experimental sections of four courses, and correlations between PPS scores and attitude scale scores were computed. It is not feasible here to describe the PPS scales fully. The scale names provide a crude indication of the variables measured by this inventory. Interested readers are referred to the PPS Manual for a fuller description of the instrument.[1]

The correlations obtained in the four courses wherein this problem was investigated are exhibited in *Table 8*. Positive correlations indicate that high PPS scores were associated with preference for small rather than large group instruction.

Conclusion—The results of this pilot study did not support the hypothesis that certain measurable personality characteristics would be associated with student attitudes toward large group instruction. This conclusion is, of course, subject to the limitations imposed by the use of a single personality inventory and a sampling of only four courses.

PROBLEM 18: Relationship between student attitudes about TV instruction and the attitudes of the assistant instructors toward TV instruction.

Students in some viewing rooms commented that it is difficult to accept TV instruction when they know that their assistant instructor is opposed to it. The assistant instructor was re-

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[1] A. L. Edwards. Personal Preference Schedule. The Psychological Corp., N.Y., 1957

TABLE 8

Correlations Between the TV and LC Scales and the Edwards Personal Preference Inventory

Edwards PPI Variables	*Course:* *Type:* *Number:*	A TV 75	D LC 85	J LC 20	N LC 67
Achievement		.07	.29**	.21	–.06
Deference		.01	–.07	.26	.32**
Order		–.17	–.03	.17	.02
Exhibition		.16	.06	–.06	–.05
Autonomy		.11	.08	–.17	–.15
Affiliation		–.01	.01	–.10	–.03
Intraception		–.21	–.08	–.09	.08
Succorance		.03	–.02	–.19	–.07
Dominance		.12	–.09	.17	.14
Abasement		.10	–.08	–.17	.04
Nurturance		.14	–.07	–.34	–.14
Change		–.22	.01	–.19	.01
Endurance		.03	–.04	.28	.09
Heterosexuality		.01	.00	.11	.02
Aggression		.03	.22*	.23	.03

*p $<$ .05
**p $<$ .01

TABLE 9

Students' Attitudes Toward TV Instruction by Viewing Section (1956-57)

Course	*Viewing Section*	*Ranking of Monitors by Attitude*[1]	*Students' Attitudes*[2] *First Semester* *S.D.*	*Mean*	*Second Semester* *S.D.*	*Mean*
A	3	2.0	1.04	3.94	0.71	4.63
	5	2.0	0.78	4.08	1.02	5.02
	6	2.0	0.99	4.38	0.89	4.78
	2	4.0	0.69	4.36	0.94	4.77
	4	5.5	0.94	4.50	0.85	4.65
	1	5.5	0.90	4.30	0.99	4.87
D	5	1.5	1.06	5.74	0.67	6.70
	1	1.5	1.05	5.67	1.07	5.88
	3	3.0	0.95	5.90	0.58	6.50
	2	4.5	0.82	6.11	0.51	6.66
	4	4.5	0.60	6.45	0.88	6.37

[1] Ranking of monitors from most to least favorable. These ranks were assigned by the TV instructor responsible for the course.

[2] Students' attitudes measured by the TV-Scale.

sponsible in certain courses for conducting discussion and for acting as a resource person when questions arose during the TV presentations.

The problem of carry-over from assistant instructor attitudes about televised instruction to student attitudes about TV was investigated in two separate studies.

For the first study, the assistant instructors in two of the courses were ranked from most to least favorably disposed toward the idea of instruction by television. This ranking was done by the TV instructor responsible for the course. The analysis of mean scores on the TV-Scale by viewing section (*Table 9*) reveals a degree of parallelism between assistant instructor attitudes and student attitudes. This is particularly apparent in the data accumulated for the first semester.

The assistant instructors were actually required to complete the TV-Scale for the second study, conducted in 1957-1958. Their instructions were to ". . . fill out this scale as if you were actually an undergraduate student who has been attending this TV course." The rank difference correlations between the TV Scale scores of the assistant instructors and the mean TV-Scale scores of the students in their viewing sections were 0.39 for the first semester and 0.24 for the second semester. These correlations were based upon results obtained from eighteen different viewing sections of three TV courses.

Conclusion—Students in TV courses appear to be sensitive to and to reflect the attitudes of the assistant instructors responsible for management of the receiving rooms. These data reenforce the desirability of selecting assistant instructors who are not opposed to the use of television for instructional purposes.

PROBLEM 19: Achievement in the TV and LC sections as a function of student attitudes about large group instruction.

The investigation of student attitudes toward TV and LC instruction is, of course, a legitimate end in itself. It was important to learn how the students felt about large group instruction and about some of the factors influencing their attitudes. In view of the evidence supporting the general conclusion that students were less favorably disposed toward large group instruction than toward small class instruction, it was necessary to inquire into the matter of possible carry-over from attitude to achievement. Did those students who were favorably disposed toward TV and LC instruction achieve at a higher level than those who held unfavorable attitudes toward the experimental modes of instruction?

The criterion of student attitudes once again was the score on the TV (or LC) Scale. The criterion of achievement was the final course examination. Students in the experimental sections were categorized on the basis of attitude scale scores. The mean final examination scores for these attitudinal subgroups were compared.

Direct comparisons between mean achievement as a function of attitudinal subgroups were obviated in a number of instances because of an ability differential between the subgroups. Wherever this ability differential occurred, the achievement data were submitted to analyses of covariance controlling on ACE scores. T-ratios were computed for those comparisons wherein the ability levels of the attitudinal subgroups were comparable.

The distributions of achievement data by attitudinal subgroups and appropriate tests of significance are reported in *Table 10.*

Table 10 is to be read as follows: Two attitudinal subgroups were isolated in Foundations of Human Behavior at the end of the first semester, 1956-1957. One of these subgroups consisted of 33 students who preferred TV to conventional instruction (TV Scale scores of 3.5 or less). The other subgroup consisted of 22 students who preferred small group to TV instruction (TV Scale scores of 5.4 or higher). The mean final examination scores of these subgroups were 113.48 and 104.73 respectively. The difference between these means was tested for significance by computation of a t-ratio since there was no evidence of an ability differential between the attitudinal subgroups. The obtained t-ratio of 2.21 indicated that the subgroup favorable to TV instruction scored significantly higher on the final examination than did the subgroup that was unfavorably disposed toward TV instruction.

The data obtained in Foundations of Human Behavior conformed to *a priori* expectations. A tendency toward similar findings was apparent in most of the courses wherein this problem was investigated. These data do not, however, constitute a strong contraindication for TV and LC instruction because mean differences in achievement as a function of attitudes were statistically significant in only three of the courses wherein comparisons were made.

Conclusion—Student attitudes about large group instruction were not major determinants of subject matter achievement. Apparently motivation from a variety of sources (*eg.* desire to earn a good grade, to please the instructor, to please the parents, etc.) is generally sufficient to overcome any negative reactions most students may have to receiving large group rather than conventional instruction.

TABLE 10

Subject-Matter Achievement as a Function of Students' Attitudes About Receiving Instruction in an Experimental Section (1956-1957)

			Exam. Scores			*Covariance*[2]
Course	*Attitudinal Subgroup*[1]	*N*	*S.D.*	*M*	*t-ratio*	*F-ratio*
Foundations of Human Behavior—1st Sem.	Fav. to TV (3.5)	33	16.88	113.48	2.21*	
	Unfav. to TV (5.4)	22	13.38	104.73		
Foundations of Human Behavior—2nd Sem.	Fav. to TV (3.9)	26	14.60	150.65		0.22
	Unfav. to TV (5.7)	28	20.19	130.14		
Air Science—1st Sem.	Fav. to TV (4.9)	26	11.12	91.73	0.08	
	Unfav. to TV (6.0)	41	21.44	92.04		
Air Science—2nd Sem.	Slightly Unfav. to TV (5.9)	30	10.72	67.67	0.17	
	Very Unfav. to TV (6.5)	23	13.45	68.61		
Physiology—1st Sem.	Fav. to TV (4.9)	21	8.95	63.00	0.75	
	Unfav. to TV (6.8)	31	7.06	61.26		
Physiology—2nd Sem.	Neutral (5.0)	19	7.07	76.79	0.75	
	Unfav. to TV (6.8)	26	8.54	75.00		
Economics—1st Sem.	Fav. to TV (4.8)	23	3.80	36.83		0.09
	Unfav. to TV (6.7)	27	4.58	33.85		
Economics—2nd Sem.	Unfav. to TV (6.0)	20	3.87	37.00		0.42
	Very Unfav. to TV (7.0)	22	5.27	34.09		
Economics—1st Sem.	Unfav. to LC (5.5)	25	5.37	38.72		0.02
	Very Unfav. to LC (6.4)	26	6.09	34.19		
Economics—2nd Sem.	Fav. to LC (4.9)	24	4.82	34.46		0.21
	Unfav. to LC (6.5)	20	4.83	35.25		
Business and Government	Unfav. to LC (5.5)	24	11.14	64.54	2.16*	
	Very Unfav. to LC (6.3)	31	26.26	51.94		
Chemistry—1st Sem.	Unfav. to LC (5.8)	23	31.72	119.56		0.27
	Very Unfav. to LC (6.7)	29	30.26	111.41		
Composition and Literature—1st Sem.	Neutral (5.0)	25	19.60	33.60		1.64
	Unfav. to LC (6.3)	32	22.80	35.72		
Composition and Literature—2nd Sem.	Neutral (5.0)	21	6.62	38.14		0.01
	Unfav. to LC (6.1)	26	5.72	42.69		
Psychology—1st Sem.	Fav. to LC (4.8)	20	15.65	103.98	1.02	
	Unfav. to LC (6.0)	32	20.19	98.44		
Psychology—2nd Sem.	Fav. to LC (4.8)	18	11.84	110.67		1.06
	Unfav. to LC (6.0)	23	15.12	105.44		
Zoology—1st Sem.	Fav. to LC (4.8)	26	10.15	66.96		4.17*
	Unfav. to LC (6.1)	25	13.94	61.44		
Zoology—2nd Sem.	Fav. to LC (4.8)	22	10.97	64.95	0.61	
	Unfav. to LC (6.1)	21	14.53	62.52		

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[1] Criterion of attitude was a Thurstone-type scale requiring students to evaluate TV (or LC) instruction as compared to conventional instruction. 5.0 is the neutral point on this scale; "scores" below 5.0 favor TV over conventional instruction. Cutting "scores" for each subgroup are indicated in parentheses.

[2] Analysis of covariance controlling on ACE score used instead of t-ratio whenever there was a sizeable discrepancy in mean ACE score of the attitudinal subgroups being compared.

*$p < .05$.

Chapter VI: Faculty Reaction to Large Group Instruction

The introduction of large classes on the Miami University campus represented a rather significant departure from the usual classroom procedures. The instructional climate at Miami prior to the initiation of the Experimental Study in Instructional Procedures favored small classes consisting of not over 25 to 35 students. Indeed, one of the major physical problems encountered by the Study was that of scheduling. Only six rooms, including auditoriums, on the campus could, until this year, accommodate more than 80 students. Although a few courses had been taught in large sections prior to the Study, most courses with large enrollments were handled by means of multiple small sections.

Faculty reaction to large group instruction was investigated separately for those instructors participating in the Study and those who did not actually teach large classes. The latter group was assumed to be vitally interested in the matter of increased class size because of the impact of this departure from "traditional" procedure upon the campus as a whole.

The faculty members participating in the Study completed questionnaires about the relative strengths and weaknesses of the experimental procedures at the end of each year. These questionnaires varied in form from year-to-year, sometimes calling for free replies to open-ended questions and sometimes requiring that the respondent check appropriate alternatives listed under each item. The questionnaire items did not constitute a scale and therefore were not scorable. These forms were designed solely for diagnostic and informational purposes. In addition, all faculty members who had participated in the Study for a full year, and were still on the campus at the time the Experimental Study terminated, were asked to submit a rather detailed appraisal of the strengths and weaknesses of large group instruction.

The opinions of those faculty members who had not taught experimental sections for the Study were solicited by means of a brief anonymous questionnaire distributed to the entire instructional staff in the Spring, 1959.

The attitudes and opinions expressed by participant and non-participant faculty members are summarized separately for the TV phase and the large class (other than TV) phase of the Study.

TELEVISED CLASSES

PROBLEM 20: The reactions of experienced TV teachers.

The sampling of faculty members who actually were experienced in televised teaching was quite small. Only eight different TV courses, involving a total of fourteen faculty members, had been offered during the period of the Study. The reactions of these faculty members are characterized by a high degree of agreement on relative strengths and weaknesses of televised instruction in spite of the fact that they expressed varying degrees of enthusiasm about teaching TV courses.

One meaningful way in which to present the opinions of this group of instructors is to let them speak for themselves. Accordingly, some of their replies to specific questions from the terminal questionnaire are quoted below. These comments are letter-coded to preserve anonymity. They are ordered in terms of the relative degree of favorability or unfavorability toward TV as a means of instruction as expressed by the *students* enrolled in their courses. The basis for this ranking is the mean score on the TV attitude scale described in Chapter III. The higher this mean, the less favorable were the students to TV in comparison to conventional instruction.

Quotations are taken from questionnaire replies by the following instructors:

Instructor A: Student reaction—4.68
Instructor B: Student reaction—5.15
Instructor C: Student reaction—5.44
Instructor D: Student reaction—5.71
Instructor E: Student reaction—5.93
Instructor F: Student reaction—6.43

"What do you perceive to be the greatest advantages of televised instruction from the teaching standpoint?"

INSTRUCTOR A: "a) The ability to exhibit demonstrations clearly to each student when this would not be feasible or possible with a large class section. b) The necessity for planning and organization to such a degree that the organization becomes meaningful to the student. c) The possibility of scheduling guest speakers and panels for one class hour when it would be impossible to impose upon them to visit several individually scheduled multiple sections. d) Better use of demonstrations and visuals. e) Saving my voice by only having to speak once instead of several times, and not having to project it with as much force and loudness as in the classroom. f) Not having to look at some of the dull, disinterested faces in the classroom."

INSTRUCTOR B: "a) Easy use of a greater variety of visual aids at appropriate times in the conduct of the course. b) Forced systematizing and organization of the course."

INSTRUCTOR C: "a) Greatest advantage is the obvious one of being able to reach as many people (students) as possible with the same material. This is particularly true regarding basic material in an introductory course. b) The use of graphic material is also facilitated, especially if the only available teaching alternative would be a large lecture class in which the use of visual material is limited by the ability of the audience to see what the instructor is talking about. c) TV instruction forces the teacher to organize his material into considerably more coherent form."

INSTRUCTOR D: "a) The capability to reach large numbers of students on a 'seat in the front row' basis. b) The saving of time normally used to repeat the same presentation to several sections of the same course. This permits more time for class preparation and assures the same presentation to all students. c) All students can see visuals. d) The opportunity to present guest speakers without demanding too much of their time to make repeat presentations to many sections. e) The smooth introduction of films as training aids without disruptions caused by pulling shades, starting the projector, etc. f) Timing of the presentation so that all points are covered during the hour. (This is, of course, a serious disadvantage to the student in some instances.)"

INSTRUCTOR E: "Ability to reach a large number of students with more impact than in a lecture class of, say, 500 students. However, there is nothing that can be done on TV with greater effectiveness than in a conventional class."

INSTRUCTOR F: "The only advantage of televised instruction is the large audience that can be reached with less personnel doing the instruction. In my subject matter this is accomplished only with a loss of teaching effectiveness and also with a loss in satisfaction derived from teaching."

"What do you perceive to be the deficiencies, if any, in TV instruction from a teaching standpoint? What suggestions can you offer to overcome these deficiencies?"

Instructor A: "The major deficiency is the lack of adequate contact with the students. I have, in part, compensated for not knowing how well they understand the material and for not knowing whether or not I am pacing myself well, by having four students in the studio while I teach. I have attempted to make some contact with my students by inviting them to visit with me during my office hours and by visiting a different class for discussion after each televised presentation. A second major deficiency is the problem of discipline created by the nature of televised instruction. If the graduate assistant proctor should be late or absent, the students are prone to leave the classroom while the lecture is in progress. This has necessitated taking measures more severe than I would like as a means of deterring students from future behavior of the same kind."

Instructor B: "None."

Instructor C: "The principal deficiency is the lack of student-teacher contact in the classroom. This may result in the students not 'warming up' to the subject as rapidly as might be the case under 'normal' classroom conditions. It may also result in the instructor not being able to pace himself properly as well as anticipate material that the students may find difficulty in understanding.

"These deficiencies can all be overcome. On student-teacher contact, written assignments are of assistance; however, the latter pose problems with respect to the instructor or his assistant finding time to read them with sufficient care so that meaningful marginal comments can be made. Also, if adequate assistance is available, the instructor in the course can 'make the rounds' of his TV classes, leaving the other sections under the supervision of teaching assistants. The latter course of action is especially workable if the university has a Ph.D. program in the subject matter, thus having an adequate supply of graduate teaching assistants who need this kind of experience as part of their training. (On 'warming-up' the students, various techniques are available, which, however, do not belong in this type of report.) Regarding the last point raised under deficiencies, this can be overcome if the instructor concerned has at least ten years of teaching experience behind him, thus knowing what material is likely to cause difficulty; or, if the TV instructor at the same time teaches the same course under 'normal' classroom conditions thereby being able to notice, by the nature of questions asked, the kind of material that is difficult for the student to grasp."

Instructor D: "a) Lack of student contact. b) As a by-product of the first deficiency, in chance meetings outside of class, on campus, etc., the TV student who, apparently, establishes a definite identity with his TV instructor, is disappointed (quite illogically) when I do not recognize him. Of course, this sort of thing happens in large conventional classes too, but the TV instructor is at a great disadvantage. c) Difficulty in determining proper rate of speaking (and pausing for note-takers) to assure student reception of course material. In a conventional class the instructor can see and gauge this. d) Limitations on instructor mobility imposed by camera requirements. The instructor must remain aware of his camera commitment and thus cannot give undivided attention to his academic subject."

Instructor E: "Absence of opportunity for discussion and clarification of points as they are made. This can be *partly* overcome by either two-way communication system or later live discussion sections."

Instructor F: "The primary deficiency is loss of contact between the student and teacher. This creates several problems. a) When the subject matter involves analysis rather than the mere presentation of facts, it is necessary for the student, if he is to learn to analyze, to be presented with a problem, to attempt an analysis, and for the instructor to indicate where the analysis is wrong. Other students learn from this give-and-take between the professor and student in question. b) The loss of the many intangible benefits that a student gets from personal contact with the instructor. It is my belief that these cannot be measured by any type of examination. c) Practice in oral communication, thinking and expressing these thoughts are lost to the student. d) If the teacher has not been clear, the student is unable to interrupt and question him. e) The inability of the instructor to take individual differences between students into account; to 'needle' some to do better work; to give the better students outside reading when they are interested, etc. f) The loss of personal 'psychic' satisfaction the teacher gets from knowing his students, seeing them learn and develop under his tutelage. A few of these deficiencies could be overcome by having a live class in the studio with the teacher."

"How do you think TV and conventional classes compare with respect to their value for the student?"

Instructor A: "I firmly believe that TV classes are at least as valuable as, if not more valuable than, regular classes for the student."

Instructor B: "At least equal—but this is a sad indictment of our ability to use the medium. If we could learn to use it properly and fully, we ought to get better results from instruction by TV."

Instructor C: "In an introductory course, it would be my impression that the value of the course is not appreciably altered. The same would be true, if the primary objective of the course would be the (hopeful) transmission of a certain specified body of data to the student. Conversely, if the primary objective of the course were to induce the student to assume a posture of critical analysis toward the subject matter, I would vote for conventional classes (at least until such time as the instructor has become a sophisticated practitioner of the television medium)."

Instructor D: "This would be wholly dependent upon the subject-matter of the course and the individual student's qualifications as a 'student'."

Instructor E: "Small lecture classes are of much greater value to the student than are TV classes. The difference diminishes as the size of the lecture class increases and at some point disappears and perhaps even reverses direction."

Instructor F: "The conventional class is far superior."

"Are there certain levels of courses or types of subject matter which especially lend themselves to televised presentations?"

Instructor A: "I think any course would have some part of it that would best be presented via television. I feel, however, for practical reasons, that classes which are of the survey type required of large numbers of students, and which are best suited to the use of demonstrations, visuals and panels, would lend themselves well to televised presentation. Courses which require a good deal of teacher-pupil interaction (e.g. some courses in fine arts) and courses which do not lend themselves to frequent changes in pace would not seem to be amenable to televised presentation."

Instructor B: "Courses requiring much practice, manipulation or discussion and/or debate probably have no place on TV. Any others could be on TV if the class were of sufficient size to warrant the cost."

Instructor D: "The subject-matter has a bearing upon the suitability of a course for TV, but I don't feel qualified to generalize about this."

Instructor E: "I imagine that laboratory-type demonstration lectures lend themselves best to TV. I think most other types of presentation suffer through TV presentation."

Instructor F: "If the course is primarily a presentation of facts, it can be taught as effectively on TV as any other way. Also in some of the sciences where class viewing of an experiment is necessary, some efficiency would be gained by TV presentation."

"How do TV and conventional classes compare with respect to your own feeling of personal satisfaction and accomplishment?"

Instructor A: "In the last year or so I seem to be getting more satisfaction and feeling of accomplishment from TV than from conventional classes. I don't seem to be able to gauge my level of success in communication as well in the conventional classroom as on TV."

Instructor B: "Perhaps equal now everything considered, although every once in a while I long to look into the eyes of the students and see their responses—for momentary ego inflation."

Instructor C: "I found no appreciable difference on the basis of one year's television teaching. My feelings may well have been influenced by the fact that I was participating in an experiment, found this exciting, and might well feel differently once the novelty of the experience would be dissipated by lengthy association."

Instructor D: "TV is deficient in this respect."

Instructor E: "The lack of personal contact and discussion plus the 'coldness' of TV make for much less personal satisfaction from teaching."

Instructor F: "I received no feeling of accomplishment or satisfaction from TV courses—only frustration."

"What factors would influence your decision about whether or not to teach another TV course?"

Instructor A: "I have decided to teach another TV class because I feel that it would be a waste of all the time I have spent learning to teach by television if I did not continue to do so, because I enjoy teaching this way and think I can do a better job by TV than in the classroom, and because I feel that I am better prepared to teach this course than some of the persons who would be responsible for some of the sections if I did not teach by television."

Instructor B: "It's still a great challenge with no real doctrines as yet. I also see a big possibility of an eventual tie-in with an educational TV network that could have great merit."

Instructor C: "First and foremost would be the teaching load I would be asked to undertake simultaneously. Second would be the kind of assistance that would be available for handling papers, examinations and clerical work. Third would be the possibility of receiving additional income."

Instructor D: "No response; the course has been discontinued at the freshman level."

Instructor E: "The only consideration is the number of students in the class. I would prefer to teach 500 students through TV than in a lecture class."

Instructor F: "I would teach another TV class provided that a live class were permitted in the studio, extra credit be given for the TV teaching and the physical conditions in the studio be improved."

"What suggestions or 'tips' do you have for someone about to teach his first TV course?"

Instructor A: "a) Exert as much pressure as possible to get released time for preparation; b) prepare as much in advance as is feasible and possible; c) watch other TV teachers both in the receiving rooms and studio (much of my improved timing and presentation came from watching instructor B in the studio on six or seven different occasions); d) have frequent meetings with the director and audio-visual man simultaneously; e) try many dry-runs using the materials planned for the presentation; f) buy some pastel colored shirts."

Instructor B: "He should tear his course to pieces—look hard for the parts that obviously dovetail with the medium. Build well on these and then fit other course substance around it. Work like a dog with the technical service staff and if he feels that he cannot take their suggestions after they have carefully considered what it is he is trying to accomplish, he should move back to a conventional classroom."

Instructor C: "a) Relax, but know your material and have it as well organized as possible. b) Rely as much as possible on your director and the professional television crew with whom you're going to work. They are your best friends in helping you make a success of the course because they have the training and experience (all you have, hopefully, is some knowledge of the subject matter). c) Insist that you be given some time off during the previous academic year, or during the summer *with pay*, to give you an opportunity to prepare your material and to familiarize yourself with the medium. d) Watch your diction and the speed of your delivery and if possible the pitch of your voice and get yourself used to looking into an all-seeing eye. e) Above all, relax and rely on the TV pros."

Instructor D: "First make a normal presentation of the material to the TV director. Explore the possibilities of presenting this material on TV together. Dry-run the presentation with a guinea-pig student and kinescope it. Review the kinescope twice, once by yourself and once with the TV director to determine technical improvements."

Instructor E: "Carefully reorganize the presentation to anitcipate questions that would normally be raised in a live class."

Instructor F: "a) Be sure that your preparation is adequate. More is needed, if done right, on TV than conventional presentation. b) Remember to illustrate with examples often. The teacher does not have the class to help. c) Use more visual aids if possible."

"Comment specifically upon your experience with the professional TV staff, and the Audio-Visual staff."

Instructor A: "My experiences with both staffs have been both pleasurable and worthwhile. The Audio-Visual Service was particularly helpful in constructing needed materials within short periods of time. The TV staff made constructive suggestions in the attempt to deter me from anything that they felt would not go over well on TV. Facilities were generally adequate with the exception of the hot lights and poor ventilation. I think the necessary improvements have been made at the new studio. Incidentally, the use of Laws Hall (a new classroom building) for TV reception should constitute a vast improvement."

Instructor B: "They are wonderful and exceedingly helpful. They're getting better and more skillful all the time. It would be desirable, on occasions, to get Audio-Visual preparations more swiftly to allow for more freedom and flexibility in the week-to-week conduct of the course."

Instructor C: "I could not have been more pleased with members of the professional TV staff and the Audio-Visual staff who worked on the course. The atmosphere they created in the studio was relaxed and at the same time meticulous with respect to professional details. The staff at Audio-Visual fulfilled all requests promptly and displayed considerable ingenuity in presenting graphic and other visual material imaginatively. In every respect, I count my association with the television and Audio-Visual professionals as the best part of my participation in the experiment in television teaching."

Instructor D: "Most helpful. Physical conditions in the studio were poor, but these have been improved. I found it quite disconcerting when the cameraman would laugh at points in the lesson which were not intended to be amusing. This is the same flustered feeling that a woman gets when she is convinced her slip is showing. Even after I had it explained to me that the crew heard only the director's remarks, I still tended to be flustered when this happened. I think the design of the classroom with conventional seating, lighting, ventilation, acoustics, etc., is still in the Dark Ages."

INSTRUCTOR E: "Both were helpful. The facilities for blackboard work were inadequate."

INSTRUCTOR F: "All were cooperative and helpful. The studio was very uncomfortable but this has been corrected with the new building."

Conclusions—The following conclusions about the attitudes of faculty members who have actually experienced televised teaching were abstracted from the replies noted above as well as from responses made to questionnaires completed at intermediate periods during the conduct of the Study.

1. The instructors in general felt that the working relationships with the TV and Audio-Visual staffs were quite satisfactory. This may be attributed in part to the fact that the technical personnel were sympathetic to the needs and requirements of the teachers. Television was regarded as an adjunct to effective teaching rather than as an end in itself. The instructors, too, facilitated the development of good working relationships by being alert to the contribution they could make toward easing the work of the TV and Audio-Visual personnel.

2. All instructors reported that they experienced an initial feeling of apprehension about being televised. This stemmed from concern about proper pacing of material in the absence of classroom reaction, and about the high degree of visibility of each TV teacher. This apprehension was dissipated in all cases wherein the faculty member taught on TV for more than one semester.

3. Physical discomfort was perceived as a serious problem because of the heat generated by the studio lights. This condition has been remedied in the new studio.

4. TV was judged to be quite satisfactory for the presentation of demonstrations, panels, interview, etc. This was regarded as a primary advantage of televised classes because it was possible to obtain participants for panel discussions and interviews who would not have been available for numerous appearances before conventional classes. Furthermore, demonstrations which would have been too unwieldy for repetitive use in conventional classes were amenable to presentation over TV. Finally, televised presentation of science demonstrations were judged to be very superior to conventional presentations of the same demonstration.

5. Most instructors felt that students learned the basic concepts as well in a TV course as in a conventional course. There were a few, however, who were not so convinced.

Virtually all instructors believed TV to be inferior to conventional instruction in the realization of the less tangible course objectives. They expressed concern about their ability to teach students to reason and communicate. They had the feeling that they were not having as much of an impact upon the students' overall growth and development as they might have had in a conventional class.

6. The degree of personal satisfaction experienced from TV classes varied considerably from one instructor to another. Some expressed loss of considerable psychic "income." Others, however, felt that they achieved a greater sense of personal satisfaction from TV classes than from conventional classes. The degree of personal satisfaction reported seems to be directly related to the degree to which students in their classes were favorably disposed toward TV instruction. It is impossible, however, to know which (if either) of these factors is cause and which is effect.

7. The factors of course organization and adequate preparation were stressed repeatedly by the respondents. Since students cannot interrupt to ask questions or clarify misunderstandings, it is imperative that the teacher have his material clearly in mind and progress through the presentation in orderly fashion.

8. Another point that emerged consistently from the replies of faculty members to various questionnaires is that TV presentations require much more of the instructor than do presentations in conventional classes. It takes time to organize materials, develop visual aids, prepare special demonstrations and to consult with the TV and Audio-Visual services.

The matter of load credit for TV teaching was investigated as a separate project and is reported in an ensuing section. In brief, however, the study of load credit supports the teachers' contention that TV teaching is extremely time-consuming. A single closed-circuit TV course was equated with about two-and-a-half conventional classes, whereas a single open-circuit TV course with off-campus enrollment was equated with about four conventional classes.

PROBLEM 21: The reactions of teachers who had not taught TV classes.

Although relatively few faculty members actually experienced TV teaching, the advent of televised instruction on the campus was regarded as being of some consequence to the entire faculty. Thus, a questionnaire was distributed to all faculty members in the Spring, 1959 in order to ascertain their opinions about TV instruction, its strengths and weaknesses, and its place on the campus.

It was anticipated that televised instruction would be sufficiently controversial to yield a high level of questionnaire return. Such was not at all the case. Even though the questionnaires were prepared in order to preserve anonymity of response, only 94 (31% of the sample solicited) were completed and returned. This is a small yield, indeed, and causes undeniable difficulty in attempting to formulate generalizations. The fact that only 31% of the forms were returned is itself, however, of considerable interest. This kind of lethargy cannot be interpreted as indicative of assent to or support of TV, but neither can it be accepted as indicative of dissent.

The questionnaire was prepared in open-ended fashion requiring the faculty member to write out his reply. The responses were readily classifiable into categories for summary purposes. These summaries were prepared separately for subgroups of respondents on the basis of the largest class they had ever taught at Miami University or elsewhere.

"What roles do you think ought to be assumed by TV at Miami in the future?"

The replies to this item were categorized along a crude continuum similar to a "social distance scale." This continuum ranged from "don't use it at all" through "use it under certain special circumstances" to "general and unqualified enthusiasm for the use of TV." The categorized replies are summarized in *Table 11.*

The replies to this item are quite interesting and informative. Thirty-eight percent of the total group thought that television should be used for entire courses taught on the campus. Eleven percent thought that TV had no place on a university campus and fifteen percent were still undecided about its place.

It is of particular interest to compare the responses made within the subgroups by size of the largest class ever taught. It is quite apparent that the *least* favorable subgroup is the one consisting of faculty members who have had experience teaching large classes. It is impossible from these data, however, to know why this should be the case.

TABLE 11

What roles do you think ought to be assumed by TV at Miami in the future?

Response Category	*Size of Largest Class Ever Taught*			*Total*
	Under 50 Students (N = 35)	*51-100 Students (N = 32)*	*Over 100 Students (N = 27)*	
a. Don't use it at all.	06%	15%	11%	11%
b. Omit or uncertain	06	18	30	15
c. Use it for cultural programs and enrichment purposes only.	23	03	06	12
d. Use it as a visual aid for demonstrations and supplementary instruction	06	09	19	11
e. Use it to teach courses off the campus but not on the campus.	14	12	15	14
f. Use it on the campus for lecture, survey or physical science courses.	31	31	15	27
g. General and unqualified enthusiasm for its use.	14	12	03	11

"What is your reaction to actually teaching a TV course? To teaching a large class other than TV?"

Replies to each of these items were trichotomized for the purpose of categorization as follows: "Yes; enthusiasm expressed about teaching a TV (or large) class"; "Yes; although certain reservations are expressed"; "No; unwilling to teach a TV (or large) class." The percentage of responses within each of these categories is summarized in *Table 12*.

The replies to these questions are indicative of the fact that a greater number of respondents are willing to teach large classes (59%) than TV classes (30%). Furthermore, as anticipated, the subgroup most reticent about attempting large group instruction of either kind was the one consisting of faculty members who had not had any experience with classes of more than 50 students. The reason most often cited by respondents within this subgroup for unwillingness to attempt large group instruction was the unadaptability of their subject-matter to large group procedures.

TABLE 12

What is Your Reaction to Actually Teaching A TV Course? A Large Class Other than TV?

Response Category	*Size of Largest Class Ever Taught*						*Total*	
	Under 50 Students (N = 35)		*51-100 Students (N = 32)*		*Over 100 Students (N = 27)*			
	*TV**	*LC**	*TV**	*LC**	*TV**	*LC**	*TV**	*LC**
Yes—Enthusiastic	17%	23%	19%	31%	19%	30%	18%	28%
Yes—With Reservations	09	20	12	34	15	41	12	31
No	46	37	53	28	33	11	45	27
Omit and Uncertain	29	20	15	06	34	19	25	15

**TV*—reaction to teaching a TV course; *LC*—reaction to teaching a large class

"What do you perceive to be the greatest advantages (if any) of instruction by TV? Of instruction by large classes other than TV?"

Since this was a free-response item, several respondents cited more than one advantage of these large group procedures. Consequently, the percentages summarized in *Table 13* do not total 100 per cent.

Approximately one-third of the respondents perceived the high degree of visibility of demonstrations and experiments as an advantage peculiar to televised instruction. In addition, both TV and large classes were thought to be relatively economical and to permit reduction in the number of multiple section offerings. The latter factor encompasses two advantages: students are exposed to better instructional quality; and instructors are freed from the monotony of teaching multiple sections.

"What do you perceive to be the greatest disadvantages (if any) of instruction by TV? Of instruction by large classes other than TV?"

The replies to these items, summarized in *Table 14* again do not total 100 per cent because the items permitted free responses.

The primary deficiency of both TV and large class instruction is related to the fact that these procedures are regarded as impersonal. The students cannot ask questions or engage in discussion. The instructor is unable to probe for information in class and to stimulate individual students to perform at the level of their maximum capability. This was regarded as a more serious deficiency of TV instruction than of large class instruction.

It is of interest to note that increased preparation time was not cited often as a disadvantage of TV instruction by the non-participant faculty members. This probably reflects the fact that the amount of time required to teach a TV course properly is not apparent to most instructors until they are actually engaged in teaching by television.

TELEVISION PERCEIVED AS A THREAT TO THE TEACHER'S ROLE AND STATUS

It has already been indicated that a majority of the instructors who replied to the questionnaire feel that television has an important place on the University campus. Thirty-eight per cent of the respondents who had not taught TV courses believed that such courses ought to be taught on the campus and about half of the respondents stated that television ought to be used for course instruction both on and off the campus. A much greater degree of general enthusiasm about televised courses was expressed by the persons who had actually taught TV classes.

In spite of this generally favorable response to the use of television for instructional purposes, TV does raise certain questions and pose certain threats to faculty members. The discussion that follows is not documented by data. It is anecdotal in nature, representing the major concerns expressed by faculty members during the course of individual conferences. Some of these concerns are of minor consequence. Others, however, require serious consideration and research.

FEAR OF TECHNOLOGICAL UNEMPLOYMENT

Data on increasing enrollments and teacher shortage to the contrary, many instructors regard television as a threat to full employment of presently qualified and capable personnel. Such fear is enhanced by consideration of the possibilities of repeating kinescope or taped courses and of the development of educational television networks which link together several colleges and universities.

Some faculty members who do not fear technological unemployment because of the magnitude of staff shortages, nevertheless express some resentment because television serves to reduce the extent of the staff shortage currently experienced. Their argument is predicated upon the assumption that the only way in which to raise faculty salaries substantially is to have the universities experience a severe shortage of qualified staff. Classroom television reduces the likelihood of increasing faculty salaries, goes this argument, because it interferes with the supply-demand process.

ROYALTY ARRANGEMENTS

Some instructors express concern about the remuneration they would

TABLE 13

What do you perceive to be the greatest advantages of instruction by TV? Of large classes other than TV?

Response Category	*Size of Largest Class Ever Taught* *Under 50 Students (N = 35)*		*51-100 Students (N = 32)*		*Over 100 Students (N = 27)*		*Total*	
	TV	*LC*	*TV*	*LC*	*TV*	*LC*	*TV*	*LC*
Omit		04%		14%		19%		11%
No advantages	03	23	12	09	07	07	07	14
Economy—more students taught simultaneously; perhaps reflected in salary increase.	40	31	31	53	41	56	37	46
Expose more students to a better teacher; freedom from monotony of teaching multiple-sections.	34	31	20	15	07	15	22	21
Students better able to see demonstrations and experiments, etc.	23		41		33		32	
Better teacher preparation and organization.	14	12	12	09	11	03	13	08

TABLE 14

What do you perceive to be the greatest disadvantages of instruction by TV? By large classes other than TV?

Response Category	*Size of Largest Class Ever Taught*							
	Under 50 Students		*51-100 Students*		*Over 100 Students*		*Total*	
	TV	*LC*	*TV*	*LC*	*TV*	*LC*	*TV*	*LC*
Omit		20%		16%		15%		18%
Loss of personal contact; inability of students to discuss and question; inability of instructor to stimulate.	57	46	66	50	78	44	66	47
Encourages objective examinations and teaching facts rather than concepts.	06	06		20			02	09
Pacing—cannot judge student reaction.	17		03		15		11	
Not rewarding for the teacher.	12		03	03	15	03	10	02
Increased preparation time required.	06		03		03		04	
Student inattentiveness.	09	06		06		06	03	06

receive should their TV courses be taped or kinescoped and rerun during subsequent years. These expressions are generally stated as cautions rather than as oppositions to TV. Indeed, a number of faculty members perceive the possibility of such reproduction as one of the primary advantages of TV instruction because it would free sufficient time for them to do reading or engage in professionally creative activities.

THE "STAR" SYSTEM

A considerable number of faculty members are concerned lest televised instruction lead to the development of "star" teachers on the campus. This chosen few would reap the rewards of rapid promotion and salary increase while the remainder of the faculty would languish as secondary satellites. A related problem, of course, is the fear that some well-trained and qualified faculty members will be assigned to clerical tasks or to the minor role of conducting discussion sections after the "star" had made his TV presentation.

TEACHERS' SELF-PERCEPTIONS

The likelihood of being relegated to the position of discussion leader and bookkeeper is repugnant to virtually all faculty members. Even those who might become the TV instructor for a large group of students, however, raise certain questions about their role as a teacher and their reasons for entering the profession. Many TV teachers sorely miss the opportunity to know their students personally and to watch each individual as he grows and develops. They express concern for the student who may be exceedingly capable, but needs the incentive provided by individual contact with his teachers.

Twice during the course of the Experimental Study in Instructional Procedures, the attempt was made to utilize faculty members as discussion leaders in the TV receiving rooms. The results were not satisfactory. At the termination of the TV presentation, for instance, a few of the discussion leaders proceeded to "*really* explain the concept or principle to the students." Certain others reported that a sense of professional courtesy prevented them from openly disagreeing with the TV presentation.

CHANGING COURSE CONTENT

Closed-circuit television does not violate the traditional sanctity of the classroom. Other instructors can, to be sure, sit in during the televised class, but these are regarded as colleagues and their comments are frequently solicited.

Open-circuit television, however, poses certain unique problems because anyone, including casual viewers, can sit in on the class. The faculty members who express concern about this fact are not raising a petty issue related to traditionalism. They are fearful lest the casual viewer (or the viewer who tunes in late) misinterpret what is being said because of insufficient background for the presentation. This is particularly distressing to social science teachers who attempt a full presentation of opposing points of view. TV audiences are not captive. Pity the sociologist who, in fairness to his students, devotes a class period to a discussion of the social implications of Marxism in Communist nations. What harm might be done by the psychologist who devotes a period to the description of mental disorder with the result that a potentially suicidal listener experiences severe depression?

THE STUDENT BODY

Higher education in America is predicated upon the premise that as many capable youngsters as possible be given an opportunity to pursue intellectual endeavors. Broadcast television will implement this premise by making college courses available to persons who cannot afford to come to the campus. It raises the possibility, however, that the socioeconomic status of the resident student body may change upward. As it becomes increasingly possible for students to receive a college education at home, an increasing number of persons who are financially pressed may elect to do so. Attendance of classes on the university campus may gradually become a luxury available only to children from the upper socioeconomic levels.

LOAD CREDIT FOR TV TEACHING

PROBLEM 22: What constitutes an adequate and desirable load adjustment for TV teachers?

TV teachers at Miami University as well as elsewhere are able to document the fact that it requires considerably more time to teach televised courses than to teach conventional courses. Aside from the matter of increased clerical work as a function of class size, the TV teacher must devote much time to matters peculiar to televised instruction including meetings with the technical TV staff and the Audio-Visual Service. He must, in addition, reorganize his course and materials to make them adaptable to the medium. A study designed to ascertain the amount of time required for teaching TV in contrast to conventional classes with a view to arriving at conclusions about load credit for TV courses was conducted in the Spring, 1958. The results of this study have been reported in detail elsewhere[1] and are summarized below.

A questionnaire concerning teaching load currently carried, load deemed desirable, and expenditure of time in connection with the TV course was mailed to a sample of college-level TV instructors at Miami University and elsewhere. In addition, each instructor was requested to complete a sequence of fourteen daily activity logs upon which he was to keep an accurate record of his activities. The logs were mailed out on a schedule which sampled activities for two complete weeks spread over a six-week period: *i.e.* Monday and Tuesday of the first week, Wednesday and Thursday of the second week, etc.

A total of 28 respondents completed the questionnaire, and 19 of these respondents also maintained the entire sequence of logs.

Actual Load Reduction for TV Teachers—The obvious problem when interpreting questionnaire responses concerning teaching load is that the definition of a "full load" varies from school to school. The issue was further complicated by the fact that some respondents taught only one out of every two or three scheduled meetings of a TV class, whereas others had additional duties in connection with the TV course (*e.g.* conducting laboratory sections and discussion sections).

Each respondent was therefore requested to define a "full load" for his department and to describe the extent of his reduction against this standard. Since it seemed unwise to disregard course-related duties in addition to actual appearances before the TV camera, the data regarding load reductions were tabulated in terms of hours actually spent in class, including TV appearances and related laboratory and discussion sections.

The data indicated that, in the majority of cases, there was administrative recognition of the additional burden incurred by virtue of teaching a TV course. The median weighting accorded the TV course in the calculation of load approximated fifty per cent for both closed-circuit and open-circuit courses. The median value is somewhat misleading, however, because four of the ten open-circuit instructors reported that the one TV course constituted their entire load.

Optimal Load Reduction for TV Teaching—The respondents were asked to reply to certain questions designed to determine how much load credit they thought should be given to TV instructors under certain specified conditions. These replies are summarized in *Table 15.*

It is apparent that TV instructors as a group believe there is some discrepancy between their actual load adjustment and the "proper" load adjustment for teaching a course by television. Closed-circuit instructors, virtually all of whom were teaching on TV for the first time, received a median load credit of 50 per cent but believed they should receive credit of 70 per cent for the first year and 50 per cent in succeeding years. Instructors on open-circuit TV believed they should receive credit for a full load the first year, and 65 per cent credit in succeeding years. The difference between the opinions of open-circuit and closed-circuit teachers reflects the greater enrollment in open-circuit courses combined with the increased administrative duties inherent in off-campus teaching.

Expenditure of Time for the TV Course—Individual differences are probably nowhere more apparent than they are in the case of expenditure of time by instructors on course-related duties. The sample of instructors included in this survey covered the spectrum. Although the calculation of median values for time expediture leading to conclusions about the "typical" teacher does violence to individuals at both ends of the continuum, it appears to be the only feasible way in which to handle data of this kind. Thus the ensuing discussion is presented with the realization that there really is no such thing as a "normal" expenditure of time. In any university it is likely that some instructors will labor as much over a single three-credit course as others do over their full load.

The base for evaluation of the necessary load credit for TV teaching was the time required for preparation and presentation to a conventional class. The median preparation time for non-TV classes, as estimated by instructors in the sample, was 5.0 hours per course per week. The addition of time actually spent in class (an average of three hours) to this median yields 8.0 clock hours per course per week as the standard.

Nineteen of the respondents maintained daily logs of their activities related to TV teaching. Since the loggers taught courses carrying variable credit, all data were reduced to a common denominator, *i.e.* hours per week required for each period of TV instruction. Thus the entry for an instructor who logged 20 hours per week in preparation for a TV course requiring him to appear on camera four times a week reads 5.0 hours per week. The log data are summarized in ***Table 16.***

Conclusion—It follows from these data that current administrative practice does not, as a rule, permit sufficient reductions in load for TV teachers. The issue of necessary adjustments for teachers who have previously taught on TV is still open

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[1] **F. G. Macomber and L. Siegel. *A Study of Load Credit for TV Teaching.* Experimental Study in Instructional Procedures, Miami University: Oxford, 1958.**

TABLE 15

TV Instructors' Responses Regarding Optimal Load Credit for a Three Credit Hour TV Course

Question	*Number of Instructors[1] Responding that Load Credit Should Be . . . .*					*Median[2]*	
	Less than 25%	*25%-35%*	*50%*	*60%-75%*	*100%*	*Closed-Circuit*	*Open-Circuit*
How much should the TV course count when taught for the first time and offered for credit to:							
a. Students on campus			10	8	8	70%	70%
b. Students off campus			6	9	11	75%	100%
How much should the course count when previously taught on TV and offered for credit to:							
a. Students on campus	3	3	10	7	3	50%	65%
b. Students off campus	2	4	9	5	6	55%	65%

[1] Twenty-six respondents completed these items.

[2] Medians were computed separately for those instructors teaching closed-circuit courses and those teaching open-circuit courses at the time they completed the questionnaire.

TABLE 16

Expenditure of Time (Hours/week) Logged for for Each Appearance on Camera

Activity	*Closed Circuit TV (N = 12)*			*Open Circuit TV (N = 7)*		
	Median Hrs/wk	*Range*	*Q*	*Median Hrs/wk*	*Range*	*Q*
Preparation for presentation	2.3	0.0 - 3.7	1.0	5.5	3.0 - 12.0	4.5
Arranging for and personally preparing visual aids, demonstrations, etc.	0.8	0.0 - 4.8	0.8	1.8	0.0 - 4.3	2.0
Training and Coordinating activities of graduate assistants and other staff.	0.1	0.0 - 1.5	0.1	0.0	0.0 - 0.5	0.2
Rehearsals, meeting with director, makeup, etc.	0.6	0.0 - 2.5	0.3	1.0	0.0 - 4.3	1.3
Conferences with individual students.	0.5	0.0 - 2.3	0.4	0.3	0.0 - 2.0	0.9
Clerical duties, constructing examinations, etc.	1.0	0.0 - 5.3	1.0	1.0	0.3 - 5.5	0.8
Time before camera	1.0	-------------	----	1.0	-------------	----
Miscellaneous (including travel to studio)	0.0	-------------	----	0.0	0.0 - 0.7	0.3
Total All Activities	6.3	3.1 - 16.4	2.0	10.6	8.9 - 18.8	3.5

since virtually all respondents included in this sample were novices at television teaching.

The data in Table 16 indicate that closed-circuit TV instructors logged a median of 6.3 hours of time per week for each hour on camera, or a total of 18.9 hours for the typical three-credit course. When this value is compared with the standard of 8.0 weekly clock hours for a comparable conventional class of three-credit hours, it is apparent that each closed-circuit TV course should be weighted as the equivalent of approximatey two-and-a-half conventional classes.

Open-circuit TV courses yielded a median time log of 10.6 hours per week for each hour on camera, or 31.8 hours for the typical three-credit course. Again comparing this to the standard for conventional classes, it would seem proper to equate each open-circuit class with four conventional classes.

LARGE CLASSES OTHER THAN THOSE ON TV

PROBLEM 23: Opinion of experienced LC teachers.

Replies to the terminal questionnaire were solicited from all faculty members who had been responsible for teaching large (but not televised) classes evaluated by the Study. The answers to specific questions by seven of these instructors are quoted in this section. Four of the instructors characterized their teaching procedure as a "lecture with occasional interruptions for questions or discussion." The courses taught by these four instructors included Classics, History of Western Civilization, Geography and Business-Government Relations. Two instructors responsible for Freshman English characterized their procedure as "guided discussion akin to a laboratory with very occasional lectures." One instructor utilized the "case-discussion" method in Marketing.

The mean attitudes of the students in these classes toward large class procedures in comparison to conventional procedures was determined from administration of the LC Scale (described in *Chapter III*) and are summarized below.

Instructor F—Interrupted Lecture—Student Attitude: 4.97.

Instructor G—Interrupted Lecture—Student Attitude: 5.28.

Instructor H—Interrupted Lecture—Student Attitude: 5.74.

Instructor I—Interrupted Lecture—Student Attitude: 5.80.

Instructor J: Freshman English—Student Attitude: 5.74.

Instructor K: Freshman English—Student Attitude: 5.87.

Instructor L—Case Discussion—Student Attitude: 5.71.

"What, if any, do you consider to be the greatest advantages of large-group instruction from the teaching standpoint?"

Instructor F: "Aside from the matter of economy, there is nothing that I am able to do with greater effectiveness or efficiency in a large class. I feel I can be equally effective in the large and small class in many portions of the work. There is, however, some material that I teach more effectively in the small class."

Instructor G: "a) Large classes contain a greater number of better, more stimulating students; b) There's a greater tendency for the instructor to come to class better prepared; c) A greater tendency for class discussions to stick to the topic under consideration; d) More frequent use of better visual materials which show up more realistically when enlarged many times—i.e. in large rooms."

Instructor H: "Develops better organization and more forceful presentation."

Instructor I: "Large classes are not superior in any way for the presentation and discussion of material. However, large classes are economical. In addition, I prefer to teach one large class to two smaller ones in this particular course. Unless we could give this course in sections of 25 students or less, some kind of lecture is necessitated by the course content. I much prefer giving one lecture to a large group than giving two lectures on the same material to two groups. The single lecture section also facilitates the examining process since it eliminates the need for two sets of exams."

Instructor J (Freshman English): "There is nothing that can be done with greater effectiveness in the large group than in the small group from my experience. All I can say is that some things can be done with no loss of effectiveness in large classes. The situation here is analagous to that of the swimming coach. He can teach factual material simultaneously to even 1000 students. However he must give individual counsel if his students are to learn to swim. Similarly in English, the student needs individual consultation if he is to learn to analyze readings and improve his writing technique."

Instructor K (Freshman English): "No advantages."

Instructor L (Case-Discussion): "a) A greater number of pertinent views, ideas, points, etc., are more likely to be developed by a large group. It is easier to build up arguments if there are more persons with varied ideas. One person vs. 20 may mean that the one person clams up, whereas 5 vs. 50 means that the five at least offer each other mutual support. b) The challenge of large groups causes you to feel that you must be well prepared for class."

"What, if any, do you perceive to be the deficiencies in large-group instruction?"

Instructor F: "a) The lack of personal contact with the students, although I feel that I can have, or make the students feel that there is, more personal contact than really exists. b) I can ask more questions to arouse student interest, and get them to ask more questions in the small than in the large class."

Instructor G: "Whenever rapport fails in large-group instruction, it is far more noticeable. When you fail to stimulate a large class, the deadening effect is much more demoralizing to the instructor than when the same thing happens in a small group. Consequently, I offer the following suggestions: don't let the large group scatter themselves all over the room; force large groups to fill the front seats; use an amplifier system so that all students can hear questions and comment."

Instructor H: "Loss of teacher-student contact. Split-up into occasional small groups would alleviate this, but the problem is one of finding the time to conduct small subsections."

Instructor I: "a) I don't get to know my students; I cannot do anything to spur the lazy, the uncertain, etc. Nor can I do as much as I would like to encourage the brighter, more curious student. b) Students refrain from asking questions when they should. c) Students feel that they do not know me and sense that I do not know them. This is a very important, though intangible, consideration."

Instructor J (Freshman English): "The chief difficulty is the burden on the teacher in 1) reading papers, 2) getting to know the students' performances in class, and 3) spending exhausting hours in student conferences."

Instructor K (Freshman English): "I have experienced a serious increase in work and strain. There has been the pressure of more students with varied hopes and demands. In Freshman English, because the grades are based on more complex criteria than in other courses, the student is more often anxious to discuss his work with the instructor. The instructor in a large class, however, has little chance to obtain a clear picture of the student from repeated recitation or from a significant number of submitted papers. Paper-grading and clerical work is a serious problem. There's not enough time to fully utilize Vu-Graph transparencies or to give needed quizzes."

Instructor L (Case-Discussion): "a) Obvious increase in paper-work: quizzes, exams, term papers, etc. b) The classroom itself presents problems. More appropriate classrooms need to be built."

"How do large and conventional classes compare with respect to your own feeling of personal satisfaction and accomplishment?"

Instructor F: "I experience a feeling of satisfaction and accomplishment in both kinds of classes. In the small class, before the year is out, I feel that we are a 'happy family' and usually at the end of the year I am sorry to see the class terminate. On the other hand, in the large class, my feeling of satisfaction is generally one that is very personal, and this is the realization that I have been able to get the material across (I hope) to such a large number of people."

Instructor G: "I regret not getting to know the more capable students better and appreciate not having to get to know the less capable students in a large class."

Instructor H: "There is an enormous feeling of personal satisfaction in seeming to hold the attention and interest of a large class. But the carry-over can only be observed from closer contact."

Instructor I: "When I have a good day, my class is with me, and my lecture is effective, there is tremendous satisfaction of having handled a large number of students well. And, to some extent, I like the challenge of a large group of normally indifferent students. On the other hand, I miss the personal rapport with individual students, and I have more qualms about whether or not my position, statements, etc., are understood than I do in the smaller class with greater rapport. It would be awful to have nothing but large classes."

Instructor J (Freshman English): "I've felt frustrated, harried and irritable as a result of having more work to do than I can possible do well."

Instructor K (Freshman English): "I have often experienced a greater sense of accomplishment in the large than in the small class. However, because of the problem of increased work, I am ultimately less happy with large classes."

Instructor L (Case-Discussion): "When a good job is done with a large group, which itself offers a challenge, the feeling of accomplishment is greater than in a small class."

"How do you think large classes compare to conventional classes with respect to their value for the student?"

Instructor F: "I believe the conventional class has greater value for the student, but the differential is not as great as many students think."

Instructor G: "I suspect that with the possible exception of student sensitivities, the large group is every bit as effective (or valuable) as is the small group for the student."

Instructor H: "Both have their value. Some lectures seem to get excellent responses."

Instructor I: "Factual content can be handled almost as well in both kinds of sections. Hence memory is emphasized in the large class at the expense of analysis and understanding."

Instructor J (Freshman English): "The practical effects were about the same. But this was because the added burden forced me to subtract time and attention from the small class and give it to students in the large class."

Instructor K (Freshman English): "In my estimation, the effects of large classes on students have not been good. a) I feel the progress in writing of such students is much slower, perhaps because the number and length of assignments have been halved. b) Further, students in the large section have seemed to be less attentive to their daily assignments. They often neglect their work since they are less likely to be called upon, and much of their reading has no immediate relation to themes. c) I have felt it necessary to be generous with students in large classes at the end of the term because I have had few papers on which to base my estimates and because I have not wanted to penalize them for participating in the experiment."

Instructor L (Case-Discussion): "There are positive values to be obtained by students in a large group using the case-method of instruction. In any given situation, a large class can be of as much value as a small class."

"Are there certain levels of course or types of subject-matter that especially lend themselves to presentation in large classes or would suffer as a result of large-group presentation?"

Instructor F: "Large classes require that the student be mentally alert and follow with you step by step. It is difficult to get a large group to do this; however, with the opportunity provided for discussion in the quiz sections, any confusion should only be temporary and students should not be expected to 'suffer.' There may be individuals, particularly freshmen, who have difficulty in large groups because they have not yet learned how to take notes and to study."

Instructor G: "The more remote the course material is from the student's knowledge, information or experience, the more likely that large-group instruction will work. The student, even the bright one, is so busy learning ideas and material that he wants to listen anyhow. As his background grows and his willingness to disagree increases, there is a much greater need for small group instruction. I do not think this has anything to do with the automatic formula that advanced classes should be small and beginning classes should be large. If students can be separated according to ability and background, then the accelerated sections of *some* beginning courses should be small. In other beginning courses all sections might be large.

"Where the course is semi-required and the students unselected, large numbers of students will be both disinterested and will probably leave us shortly anyhow. I can find little justification for spoon-feeding them into a passing grade. I also have little interest in 'getting to know them better.' Most of them, I regret to say, I find not very interesting to know.

"Approximately half *are* interesting and I would like to get to know them better. If somehow, we could keep the more promising half in somewhat smaller sections, with the most promising in very small sections (25), I would be content to lecture to the mediocre bottom half in large numbers. They probably would not contribute anything in classes of 10, so why not put them in classes of 100 plus? Until some kind of selective admissions policy is achieved, this may be the only solution."

Instructor H: "It doesn't seem to make a great deal of difference."

Instructor I: "Factual courses are better than analysis courses in large groups. In both cases, I am convinced that the small class is superior, but it is a question of what you are willing to sacrifice to obtain other objectives, such as economy."

Instructor J (Freshman English): "Anything beyond factual material cannot be properly covered in large classes."

Instructor K (Freshman English): "I know of nothing that cannot be handled in large classes, provided that we are able to overcome the difficulties involved in expenditure of time by the instructor."

Instructor L (Case-Discussion): "A case methods course at the freshman level will go better with smaller numbers than with large numbers because of the lack of experience in regard to the topic. At the senior level, in contrast, a case method course can be successful for a large class."

"What factors would influence your decision (or have influenced you) about whether or not to teach another large class?"

Instructor F: "I have decided to teach another because a) I believe the department should build the student-faculty ratio; b) I know for sure that I can teach large lectures; c) the department would like to strengthen its graduate offerings and the large class offers opportunities to attract graduate students to Miami as graduate assistants."

Instructor G: "a) The subject matter will influence my decision about whether to teach a large or small class. If the subject requires student discussion, the large class won't work. b) Facilities: a poorly ventilated, dreary room is terrible when large classes are to be taught. If I can have a good room and adequate assistance from the Audio-Visual Service (as I have had in the past) I would be happy to teach large groups."

Instructor H: "The material of my course is of such basic importance and of such stimulating variety it seems almost a waste not to admit all, or any, who wish to choose it. Large groups work as well as small ones."

Instructor I: "I decided to do it because: a) the economy of such an arrangement; a willingness to pull my oar in helping ourselves make pay increases possible; b) an aversion to going over the same material twice in two smaller classes; c) the conviction that one class of 140 was no less effective than two of 65 or 70.

"However, I will not accept another class of 140 students for physical reasons. It is too draining and demanding, both on my voice and on my general sense of fatigue. I *work* when I teach."

Instructor J (Freshman English): "For the bland average of all college courses, I can see that large classes might not be less effective than small ones. However, they are not suitable for Freshman English. Furthermore, it is criminal to force gifted students into mass calisthenics."

Instructor K (Freshman English): "The factors that would influence my decision would be a) adequate trained help and b) adequate remuneration."

Instructor L (Case-Discussion): "I am more willing to teach a large class now since I know that they can accomplish as much as small ones in regard to achievement. Proper facilities and adequate assistants are needed for large-group instruction."

"What suggestions do you have for someone about to teach his first large section?"

Instructor F: "I think that most of the things you do in a large class should be done also in a small class. However, one should be cautioned to pay particular attention to certain techniques and to be sure to use them. a) Write larger on the blackboard. b) Be sure that all sections of the room can see demonstrations and visuals. c) Be as informal as you possibly can but still not to the degree that you would lose the respect of the class. d) Try to deliver your lecture so that you are constantly shifting your eyes to individuals in all parts of the lecture room, and actually talk to these individuals. This, I feel, makes the student feel that you are talking to him personally. e) Constantly vary your voice. Try to avoid a monotone and be sure that all people can hear you. f) Make your instruction as personal and as informal as possible using material to illustrate and even, if necessary, 'acting things out.' g) Be sure that you have presented to your students in the first lecture what you expect them to do. This would include your own idiosyncrasies such as attendance regulations, presentation of excuses and the asking of questions, the purpose of the quiz section, etc."

Instructor G: "Relax. Come prepared. Use humor as often as possible. Do *not* lecture from rigidly prepared notes."

Instructor H: "Dramatize. Intersperse occasional personal opinions and illustrate carry-over to the real world. Improve voice and delivery—vary speed, voice level, intensity. Practice precision in enunciation."

Instructor I: "a) Be twice as well prepared for the large class. b) Try to remember that the lecture method differs from the discussion method in small classes. Ideally each day's lecture should develop one beautifully organized and presented bead, to be strung onto a necklace one at a time. c) Use the blackboard a good deal for outlining and emphasizing points. d) Vary voice inflection or you'll have them asleep in 10 minutes. e) Try to reserve the more interesting, provocative, dramatic for lecture and handle, if you can, the duller material in class assignments. f) Don't be afraid to stop the class after you have finished your major point even if this happens considerably before the bell sounds. g) Explain all of the mechanics of the course in a mimeographed outline at the beginning of the semester. h) Don't be afraid to digress when the class obviously wants to. i) Don't pretend to know everything. The size of the audience somehow goes to your head and makes you less relaxed than in a small class unless you watch it."

Instructor J (Freshman English): "If the person is competent and professionally dedicated, and is about to undertake large classes of freshmen, I should urge him to resign or pursue Yoga."

Instructor K (Freshman English): "No comment."

Instructor L (Case-Discussion): "Get a feeling of support and cooperation from the group right at the beginning. Make them willing to talk and discuss."

"Miscellaneous Comments"

Instructor F: "The student-teacher relationship breaks down in large classes. I know that I have to cross the campus very cautiously, scanning faces for fear that I might be slighting someone I should know, but do not know. I think, however, that the students have a feeling that since I have been talking to them, I have a much greater interest in them as individuals than is actually the case. This is good. It isn't that I am not interested in them; I simply don't get to know them."

Instructor G: "The one very important weakness is that you fail to get to know the good students. Here the fault is not so much with large group instruction as with our inability to separate students into different sections according to ability.

"No instructor should handle more than one very large section. He should always have at least one small 'honors' or advanced section to help him keep his perspective. Like the policeman who handles nothing but the accused and the psychiatrist who meets the mentally ill constantly, an instructor who teaches only large groups of unselected students may forget that there are many first-rate students who need special stimulation and who will respond to special challenge."

Instructor I: "The biggest headache of large classes is the matter of examinations and grading. In many courses, faculty wives might be induced to serve as readers and, if an instructor could train one over a year or so, he might get back to using essay questions.

"I see no reason why a three-hour course must meet three times a week. I don't know enough about my fields to be scintillating 45 times a semester. It would greatly ease the drain on the lecturer if he could, from time-to-time (or even usually) meet his class twice a week and give the students greater amounts of reading in lieu of the third hour.

"Every lecturer responsible for large classes ought to have an assistant to do all sorts of leg work. This need not be a graduate student.

"I would like to see some way worked out whereby a lecturer could receive same modest stipend for a period of about two weeks in the summer when he could spend full-time working on his course. Perhaps this shouldn't be necessary, but if he feels overworked and under-appreciated during the school term, he may

TABLE 17

Percentage of Respondents Favoring Various Solutions to the Problem of Increased Enrollment

"Solution"	*Size of Largest Class Ever Taught*			*Total*
	Under 50 Students	*50 to 100 Students*	*Over 100 Students*	
Increase class size and hold credit-hour load constant.				
% Favorable	52	63	56	56
% Unfavorable	31	25	15	24
% Undecided or No Response	17	12	29	20
Employ additional instructors and hold class size and salaries relatively constant.				
% Favorable	03	31	15	16
% Unfavorable	80	53	48	61
% Undecided or No Response	17	16	37	23
Utilize TV and other large group procedures in courses with large enrollment.				
% Favorable	71	75	67	71
% Unfavorable	17	16	15	16
% Undecided or No Response	12	09	18	13

be reluctant to steal time from his family or other work during the summer.

"It would be most helpful to the ego of lecturers if the Administration could find ways and means of combating the attitude (which they themselves support from time-to-time) that the *real* teachers are those few Socratic colleagues sitting in small rooms with six or seven students clustered around them."

Conclusions—The following conclusions about the attitudes of faculty members who had actually been responsible for teaching large classes were abstracted from the replies noted above as well as from responses made to questionnaires completed at intermediate periods during the conduct of the Study.

1. Most instructors felt that large classes were unsatisfactory from the standpoint of providing opportunities for students to raise questions and clarify misunderstandings. They expressed concern about the fact that they don't really get to know their students.

2. Large and small classes were judged to be of about comparable effectiveness with respect to adequacy of content coverage and the extent to which students learn the basic facts and concepts. Small classes were regarded as superior for the realization of all other course objectives.

3. Most instructors report that there are certain psychic satisfactions to be derived from teaching a large class. These do not fully compensate for the lack of student-teacher contact, however.

4. Most of these instructors were willing to undertake another large class provided that adequate assistance is furnished and equitable load reductions are provided. The general consensus regarding load adjustment is that each large class should be credited as two small sections. Furthermore, the instructors felt that the load adjustment should be independent of prior presentations of the course.

PROBLEM 24: Opinions of faculty members who had not taught LC sections.

Certain of the responses of nonparticipants in large-group instruction have already been discussed. These opinions were expressed by the 31 per cent sample of faculty members who returned the completed questionnaire distributed in the Spring, 1959.

The data cited in *Table 12* indicate that the respondents were somewhat more inclined to undertake large class instruction than TV instruction. They perceived the primary advantages of large-class instruction to be economy and the fact that more students are exposed to better teaching *(Table 13)*, and the greatest disadvantage to be the loss of student-teacher contact *(Table 14)*.

The questionnaire also contained the following hypothetical, but realistic item:

> The budget of Miami University will not be increased to the extent necessary to allow both desirable salary increases and necessary staff additions to accommodate a considerable increase in the size of the student body. It is also doubtful, at the present time, that the state universities will be permitted to pursue a policy of selective admissions.
>
> There are several possible solutions to this problem of increased numbers. Please react to the following proposals and add any others that you believe to be practicable.
>
> a. Hold credit hour teaching loads constant, but increase class size throughout all departments to accommodate University growth.
>
> b. Hold salaries constant and employ

additional instructors to carry the load without greatly increasing class size.

c. Utilize TV and other large group procedures in common curriculum courses and in other courses which have large enrollments of students, in order to maintain small and medium-size classes in upper division and highly specialized courses.

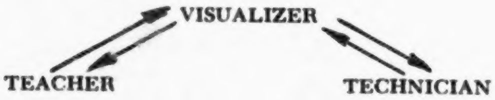
The percentages of replies favoring each of these alternatives are summarized in *Table 17.* The solution most often cited as acceptable to the respondents is to utilize TV and other large group teaching procedures in common curriculum courses and other courses which have high enrollments. The least acceptable solution would involve employment of additional instructors at the expense of salary increases.

Quite a variety of alternative solutions were suggested by the respondents. Most frequent mention was made of the necessity for convincing the legislature to allocate larger budgets for higher education and of the desirability of increasing tuition fees.

Chapter VII: The Role of the Audio-Visual Service

Instruction in higher education is traditionally conducted through the use of words to symbolize situations, concepts, meanings. Verbal symbols represent an economy in the learning process, and the more abstract the symbols, the greater the economy. However, because the language of a subject is not clear in meaning to those who are students and not experts in the subject, words themselves become a source of difficulty in teaching both large and small groups.

In small classes, which usually permit active student participation, the meanings of symbols can be clarified by discussion; but with the increase of both the knowledge to be taught and the size of classes, instructors have had to find ways other than discussion to make communication effective. One proven means has been the visual representation of symbols. As a result, instructors have sought assistance in developing effective visual materials and have in effect created a demand for persons who are experts in "visualization." This situation has led to a relationship which can be represented:



Because of the specialized nature of the talents and mechanical facilities involved, the visualizer and the technician tend to be brought together into departments variously called, "audio-visual centers," "audio-visual services," "teaching-aids divisions," "visual education services," etc.

To give further guidance and direction to the Audio-Visual Service, the Audio-Visual Advisory Committee promulgated a statement of basic philosophy. This was, subsequently, adopted by responsible administrative units on the campus. The statement is reproduced in *Appendix VII-I.*

ORGANIZATION OF THE AUDIO-VISUAL SERVICE

The Audio-Visual Service department was established to provide the functions of visualizer and technician. At Miami University four divisions of activity are encompassed in the Service. These are consultation, utilization, production, and materials library.

The function of *consultation* is three-fold; namely: (1) to secure materials already prepared; (2) to serve as a visualizer between the teacher and technician in the development of specifically designed new materials; and (3) to assist in the integration of these materials into the teaching pattern.

A comprehensive *utilization* program incorporates the mechanical activities that go together to make for an effective presentation. Included are such things as scheduling, acquisition, projection, and assistance in presentation.

The *production* function is designed to produce specific materials tailored to the instructional needs of particular courses. This includes the various photographic operations required for slide, film strip, flat picture and motion picture production. Also available are the facilities for original graphic art construction, as well as the reproduction means for the transference of graphic material to the printed form or to the projectable form.

The function of the *materials library* service is primarily that of making available on the campus those audio-visual materials which have been produced elsewhere and which can be obtained through rental or purchase. An annotated catalog of films owned by the University is revised annually and distributed to the faculty.

The combination of formal consultation, in addition to the ever present informal contact, a balanced production unit, a comprehensive utilization service, and a materials library has resulted in a greatly expanded use of teaching materials.

To secure an evaluation of the role, organization and performance of the Audio-Visual Service, a survey team representing the Department of Audio-Visual Instruction of the National Education Association, was invited to the campus. Their comprehensive report is included in *Appendix VII-II.*

GENERAL OBSERVATIONS

During the conduct of this experimental project certain empirical observations have been made by the staff of the Audio-Visual Service. Of greatest significance is the fact that there must exist in the college community a climate favorable to the establishment of an audio-visual program. This climate is made up of many components.

It is necessary to have an administration that believes in providing services to the instructional staff. This provision of services entails adequate financing, accessibility to a program broad in its coverage, physical facilities, and a staff with a variety of skills and talents.

This climate also includes the receptivity of the instructional staff. It is noted that there is an ever-increasing concern on the part of teachers for more effective ways of teaching. There is a realization that even though communication at the college level is primarily verbal, there is still need for elaboration and illustration. The faculty has come to demand specific materials for specific needs. There is an ever-increasing awareness of the multimedia methods of presentation. In this climate a very interesting growth has occurred. This increased demand for teaching materials is represented in *Figure 7-1.* Line A represents the anticipated normal growth based upon conditions prior to the Experimental Study in Instructional Procedures. Line B represents the increased utilization anticipated to meet the demands created by the Experimental Study itself. However, approximately one year after the institution of the Experimental Study, campus-wide use of teaching materials departed from all predicted consumption values, and is represented by Line C.

There are, of course, many reasons for this phenomenal growth, but the two most important probably are: (a) The opportunity for expansion and development, with the attention focused on teaching materials—this as a result of the experimental program, and (b) The creation of the climate as previously elaborated.

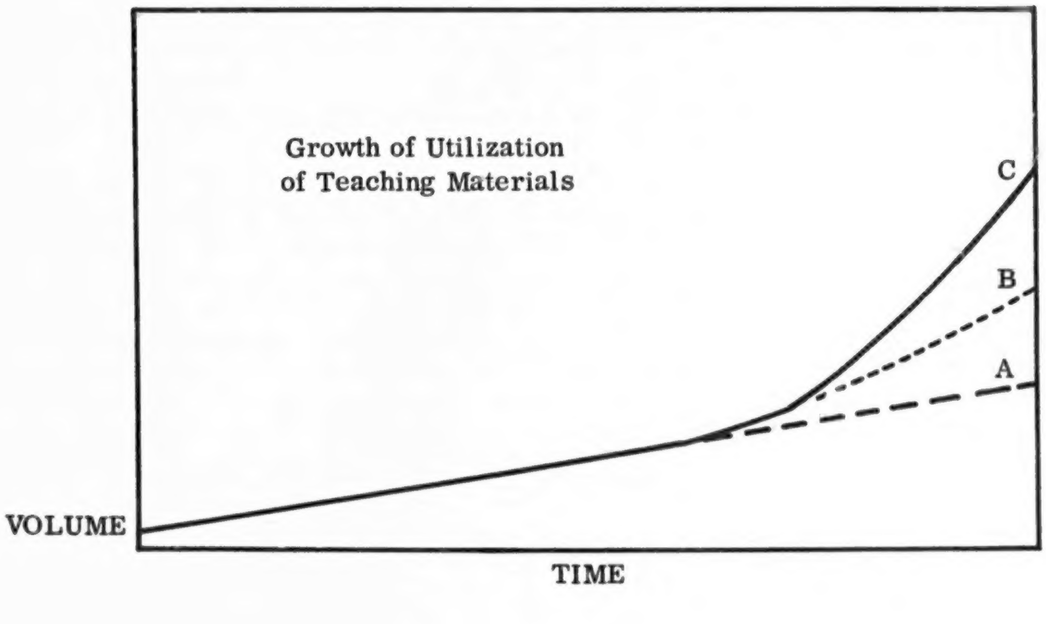
There are many valid deterrents to wider use of teaching materials. The two most often voiced by the faculty are those of "time" and "cost." To attempt to circumvent these deterrents, a plan was initiated so that no teacher need be concerned, within reason, about the cost of production, cost of rentals, or the cost of utilization. As to the time element, no complete solution has been found. It must be noted that the effective use of teaching materials does require more time on the part of the teacher. However, the opinion prevails that since the use of materials requires advanced preparation, there will normally result an improvement in the teacher's effectiveness.

To reiterate, it is further held that the most significant factor in the development and conduct of Audio-Visual Service is the climate existing in the college community which it serves. This climate, as described above, is made up of many tangibles and many intangibles. Above all else, such a department must have an orientation toward service.

SPECIFIC OBSERVATIONS

Growth in utilization of the Audio-Visual Service has been described previously. This growth includes all forms of presentation, but a large portion of this development occurred in the area generally referred to as "graphics." Of particular note was the expanded use of overhead projectables.

Figure 7-1.



The Experimental Study in Instructional Procedures was not designed to test the effectiveness of various "audio-visuals." Rather, emphasis was placed on the development of materials to assist in increasing the effectiveness of large group teaching. In this connection, a few methods are worth mentioning. A procedure for quickly converting short themes into transparencies for use in an overhead projector was developed for the English Department. This kind of visual offered considerable flexibility in mechanical presentation and permitted a visible teacher-student critique. The superiority of this kind of projection as compared to the cumbersome, limited access of the opaque projection technique or of writing a theme on the blackboard is apparent.

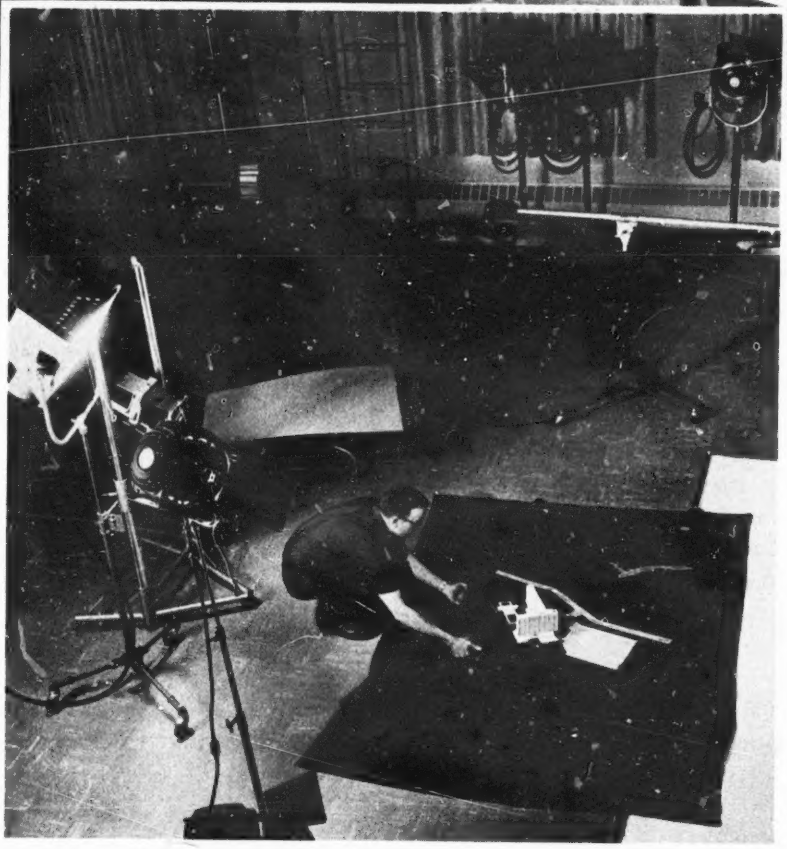
Because of the availability of art talent and printing facilities, extensive graphic testing material was produced. These facilities were used heavily by the Geography, Social Studies and Physiology departments.

Still another procedure evolved which has been locally identified as a "multi-media" approach. Combinations of teacher-visualizer-artist worked out details of black and white illustrations for use in front of the TV camera. These usually were 9x12 to 11x14 inches in size. Since these were original illustrations, it was thought worthwhile to reproduce them in printed form of a size suitable for distribution to students for notebook reference. At this point, color was introduced to aid in the differentiation of systems. (Other illustrations were rendered in black and white when identification of components was not significant.)

An illustration of a size usable on TV is not usually large enough for large-class use. In order that the teacher might have this material available for large-class presentations, the original drawings were reproduced as projectable transparencies for use on the overhead projector. Systems separation was accomplished by the individually colored overlay technique. In some rare cases, the original illustration was enlarged to 30x40 inch poster-form with subsequent identifying color addition.

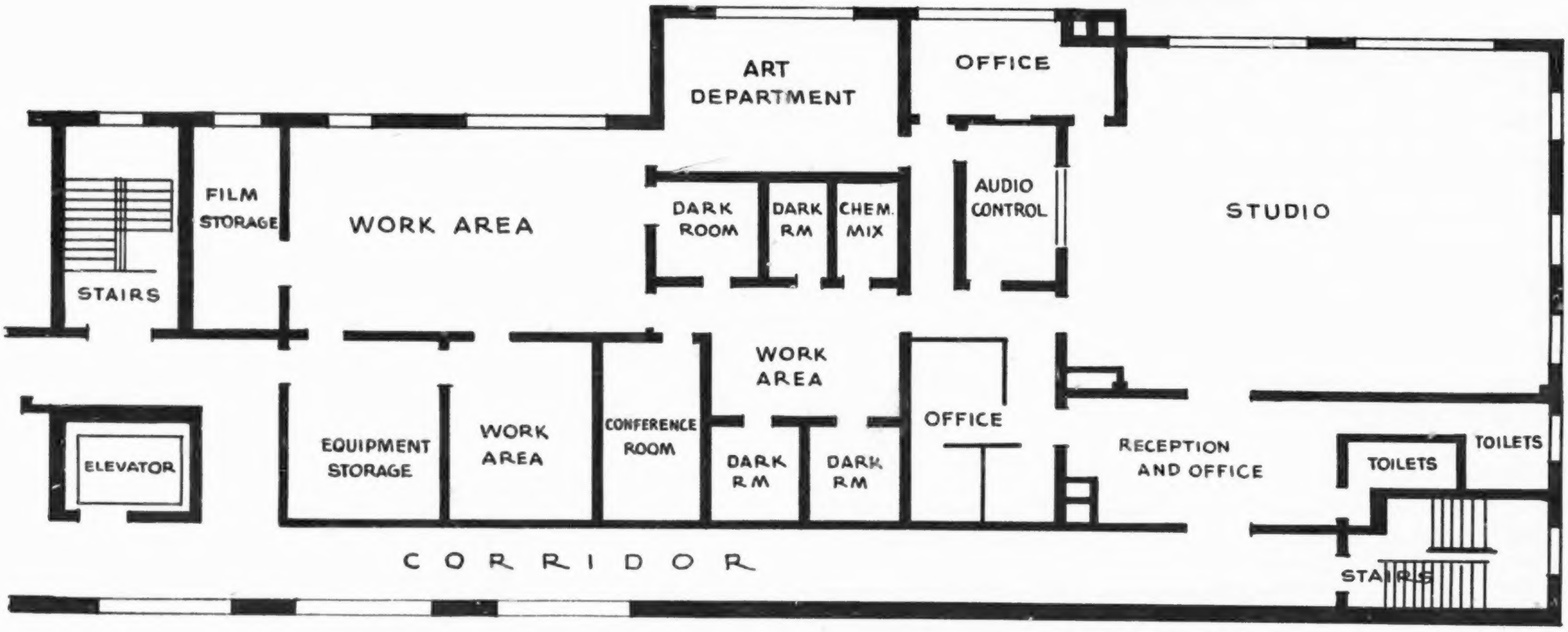
This "multi" presentation development is possible only when there is a grouping of talent and facilities. It points the way toward even more effective presentations in the future.

General graphics production room of the Miami University Audio-Visual Service. This room is the largest of the areas designated as "work area" on the floor plan below.



An architectural model being photographed to make a slide in the studio of Audio-Visual Service.

Floor plan of the area in Gaskill Hall, Miami University, occupied by Audio-Visual Service.



Chapter VIII: Problems of TV Teaching

The production of a telecourse involves a considerable investment in equipment and facilities and necessitates close cooperation and extensive planning between teaching and production personnel. The numerous problems of television are discussed under the three general topics of (1) Personnel, Equipment, and Space Needs; (2) Policy for Televised Instruction; and (3) Techniques Effective in Televised Instruction.

Many problems unique to this University were encountered. This presentation, however, will be concerned with those of general interest.

PERSONNEL, EQUIPMENT AND SPACE NEEDS

Certain decisions regarding personnel, equipment and space for telecasting and reception were required before embarking on a program of televised instruction.

TECHNICAL PERSONNEL

A major problem was the extent to which professional personnel could be employed for TV production, and the extent to which non-professional personnel could be utilized. It was demonstrated that cameras and control equipment can be operated very satisfactorily by students if professional personnel occupy the key positions of director and engineer and give adequate supervision and training to student operators. Training sessions in the use of cameras and controls were provided for students so employed.

A crew of five students, plus a staff director and engineer, proved adequate for handling production of all classes except those requiring special demonstrations. In general, assignment was as follows: the staff director was in charge of production; with him in the control room were the engineer and two students who operated the audio and video master controls. Two students manned cameras in the studio while a student floor manager assisted in setting up special demonstrations, set lights, and helped the TV instructor whenever needed. When the third camera was put in operation, one or two additional students were used. Slides and films were cued in advance by the engineer, and were remotely controlled by the student audio-control technician, who also handled audio recordings.

EQUIPMENT FOR ORIGINATING TELECOURSES

Black and white vidicon camera equipment was chosen over image orthicon because of the cost factor and because of this equipment's ruggedness and simplicity. The vidicons used have performed well during four years of production; pictures have been sharp and satisfactory, comparing favorably with those of commercial stations.

Equipment added after the first year of operation included lighting units, an audio tape recorder, a second turntable, and a two-camera remote unit.

Remote transmission equipment was acquired, and was mounted on a steel platform with heavy casters. This equipment serves a triple need: as a stand-by unit in case of prolonged shutdown of the main studio units, as remote equipment when such a need arises, and as equipment for training students.

All equipment including a one KW on the air transmitter is now installed in a new $240,000 Radio-Television Center, which contains complete facilities for radio and television broadcasting, instruction in broadcasting, and offices. The building is adjacent to a 340 foot tower which supports both FM and TV antennas.

STUDIO OR CLASSROOM ORIGINATION?

A question to be answered before space needs could be determined was whether TV should originate in a classroom adapted to the needs of television, or whether origination should be made under studio conditions. For a number of reasons, studio origination seemed preferable.

In general, televised teaching must be directed to large numbers to be feasible on the basis of per-pupil cost. This means that many more students must be enrolled in a class than those who can be physically present in a classroom with the TV instructor. Televising in a room with a class present may bolster the courage of the instructor but does not facilitate improvements in the quality of TV instruction. Televised teaching requires new techniques, new materials, and the space, equipment, and lighting conditions of the TV studio if a quality picture is to be produced and the teaching itself adapted to the strengths and weaknesses of TV as a communications medium. It was believed better to develop conditions conducive to quality in picture and teaching from

The following initial equipment was utilized:

14–21" table model TV receivers	$ 2,051.00
1000' RG59U Coaxial cable	67.00
10 Custom built connecting boxes for receivers	125.00
3 Vidicon[1] studio-type camera chains complete with control units, power supplies, lenses, tripods, 3-wheel dollies, and inter-communication sets	13,500.00
1 Video switching system	3,695.00
1 Synchronizing generator	1,530.00
1 Audio control console	1,775.00
1 Vidicon film and slide chain, including one vidicon camera, console mounted camera control, 14" television picture monitor, wave form monitor, 2 power supplies, 2 16 mm. sound film projectors, 1 TV multiplexer, and 1 automatic 2"x2" slide projector	7,323.00
1 Radio frequency distribution amplifier	565.00
Miscellaneous test equipment, including tube testers, an oscilloscope and video probes	2,161.00
Minimum studio lighting package	739.00
Studio and control room audio facilities, including three microphones, a microphone boom, and a transcription turntable	1,021.25
Total Cost of Initial Equipment	$34,522.25

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[1] The major portion of equipment was purchased from the Sarkes-Tarzian Corporation of Bloomington, Indiana.

the beginning; consequently, teaching studios have been developed and used. Experience has since demonstrated that while instructors are loathe to go on TV at first without a class physically present, they soon accommodate themselves to "teaching to the camera" and actually prefer studio teaching after a short time.

THE RECEIVING ROOM

The rooms used for receiving televised instruction have been conventional college classrooms generally planned to seat from 35 to 50 students. These rooms, while quite satisfactory for conducting a discussion or "interrupted lecture" type of teaching, are not satisfactory for televised teaching. It is difficult to locate receiving sets so that they will be free from glare at all times of the day, and so that they can be observed by all students in relative comfort. Most rooms have a bank of windows along one side which must be blacked out, resulting in severe ventilation problems on hot days or on days when the thermostat is not functioning properly; and these days are many during the year. The banks of fluorescent lights give adequate illumination with drawn shades, but create reflection problems of their own. Acoustical properties which are reasonably satisfactory for conventional teaching are not necessarily satisfactory for TV receiving.

The problem of room management also has not been solved satisfactorily. In situations where there is to be no discussion in connection with TV presentations, the use of student monitors for purposes of room administration is reasonably satisfactory. The use of graduate assistants for groups of 35 students to conduct discussion sessions in conjunction with TV works well if adequate planning time is arranged with the TV instructor, but is expensive, and makes the "break-even" point in financing difficult to achieve. The use of regular faculty members as discussion leaders is unsound economically and has not proven to be satisfactory for other reasons.

There is a great need for research on receiving rooms and their management. Experience, not supported by research, indicates the need for receiving rooms which are air conditioned, which have no windows to create reflection problems, which are acoustically fitted to TV reception, and which will have lights adequate for note taking but which do not reflect in the receiving sets. Rooms which would seat sixty to eighty students arranged in an arc or semi-circle with receiving-set locations engineered into the room structure would seem to fit the needs for television, and still serve conventional classes in a highly satisfactory manner when so needed.

Two other problems of TV reception still not satisfactorily solved are (1) securing sets with larger tubes with high resolution and satisfactory light level, or of using large screen projection, and (2) the problem of teacher-pupil interaction. While a two-way inter-communication system to achieve teacher-pupil contact works quite well in experimental situations with only two or three receiving rooms and seventy or eighty students, it holds little promise when receiving groups are of the size which they must be for regular use of televised teaching.

POLICY FOR TELEVISED TEACHING

Two problem areas relating to televised teaching which were given careful attention were (1) the extent and nature of rehearsals and (2) the working relations of instructor and the director. Should complete rehearsals be required for each presentation? Should a script be prepared and adhered to, or should there be considerable freedom of thought and movement during teaching? Does a director actually direct the instructional process itself or must the instructor have complete freedom in his manner of presentation?

REHEARSAL POLICY

Course instruction, for several reasons, does not necessitate the split timing of the commercial program, nor does it require the finely coordinated actions of actor and camera which can come about only through rehearsal and adherence to a detailed script. A considerable amount of freedom is desirable to maintain an atmosphere of informality of instruction. On the other hand, the presentations must be "professional" and show evidence of careful planning and execution. The evolved procedure represents a compromise between strict adherence to a prepared script and the informality generally characteristic of conventional teaching. It calls for an outline of the presentation, together with a sequence of action, and for whatever rehearsal seems necessary to assure a smooth performance. The general procedure is described briefly in the following paragraphs.

TEACHER-DIRECTOR PLANNING

Development of Syllabus by Instructor—A master outline of the course was prepared by the instructor. This included course objectives, an outline of the subject matter to be covered, and an indication of the visuals which had been used by the instructor in conventional classes.

Initial General Planning Conference—The course and its objectives were discussed. The director was given a copy of the syllabus and text book for study. The role of the teacher-director team was developed.

Second General Planning Session—Some of the peculiar aspects of TV production were pointed out by the director: the potentialities and limitations of television; the "gray scale" and how it affects visuals and clothing; the 3 by 4 aspect ratio peculiar to television and how it dictates the pictorial form of all presentations; the limitations of movement, cameras, and lighting; the possible necessity for make-up; the preparation, treatment, and handling of visuals; the use of the microphone; the function of studio and control room equipment; and the duties of the production team in assisting the teacher.

Third General Planning Session—The operation of TV receivers and the responsibilities of classroom supervisors with respect to the equipment was discussed. Classroom proctors were present at this session along with director and teacher. Rough "run-down sheets" for the first week of classes were frequently brought by the teacher, and these were checked over by the instructor and director.

Final General Conference—The "run-down sheets" for the first week of classes were thoroughly checked and clarified by instructor and director.

Tri-weekly Conferences—Throughout the school term, regular conferences were scheduled by instructor and director prior to each TV presentation.

THE "RUN-DOWN" SHEET

In any televised teaching it is necessary for all personnel involved in the telecasting operation to know when to expect visual materials, demonstrations, or other elements that require set-up and proper camera position.

Unless the production team knows what the teacher will do next, it can not get in position to present what is wanted when it is wanted. Likewise, it is essential that the instructor be able to anticipate crew readiness as a guide to his movements. Thus it is important that a well-developed "run-down sheet" be prepared by director and instructor before the beginning of each presentation, and that copies be distributed to instructor, director, floor manager, and any others who may need to know the sequence of special materials. This "run-down sheet" contains an outline of the content with approximate timings for each subdivision, and an indication of the time of use of visuals and the order of their use. Strict adherence to this plan proved mandatory for good production.

One important advantage of the use of such a "run-down" sheet in what might be termed "ad-lib production" should be pointed out. While content is well organized and all personnel are aware of the sequence involved, spontaneity is not sacrificed.

NEED FOR ADEQUATE PREPARATION

Although complete rehearsals were eliminated, it was still desirable to provide for sufficient time to make special set-ups, check lighting, and rehearse difficult portions of presentations prior to going on camera. This generally was done during the hour preceding each televised class.

THE INSTRUCTOR-DIRECTOR RELATIONSHIP

The relationship between instructor and director was found to be very important to the effectiveness or lack of effectiveness of televised instruction. In an enterprise depending on team cooperation, harmony between these two key persons is vitally important.

Since the teacher is ultimately responsible for the content of a course, it was felt that he should be given a position of autonomy. If there was conflict between his views and those of his director, his opinion prevailed except in purely technical matters. At the same time, it was felt that the function of the production team was to help the teacher do a better job. Furthermore, it was recognized that to be of maximum effectiveness, any team must know what signals its quarterback is calling. If, as an example, the teacher frequently changed his mind at the last minute in regard to visuals he had planned to use, the director had no choice but to commit one of his cameras to visuals, in case they might be called for at an unscheduled time. If, on the other hand, the director knew that production decisions made in advance would be adhered to by the instructor, he enjoyed a much greater freedom, which led to brisker production and greater overall effectiveness. It also led to happier instructor-director relations.

TECHNIQUES EFFECTIVE IN TELEVISED INSTRUCTION

The following techniques were used in teaching via television, with results noted:

LECTURE, MODERATE USE OF BLACKBOARD

This typical teaching situation is not overly effective on television, unless the teacher is a very dynamic person with a personality strong enough to sustain attention. The lecture itself does not take advantage of the unique characteristics and advantages of the medium, which allow for maximum use of other techniques.

INTERVIEWS OR PANEL DISCUSSIONS

The use of experts in an interview or panel discussion with the instructor was very effective. Students pointed this out as one of the advantages of TV; they commented that such authorities could not be brought into every section of the course if it were taught in the conventional way.

A variation of the same technique was to have a discussion with student panelists. Besides the valuable experience to the students who participated on these panels, there was the advantage that questions which other students would like to have asked were voiced and answered. In addition, there were the advantages possessed by any panel discussion—informality, spontaneity, and interest value.

Panels were often used to demonstrate attitudes or behavior characteristics. In a course concerned with human growth and development, for instance, a panel of teenagers discussed topics with which they were concerned: dating, studies, parents, teachers, etc. In this panel the instructor was interested in their attitudes, ideas, and concerns, and also in the behavior they demonstrated during the presentation itself.

FILM

Movies were used in various ways. Short film clips were used to clarify points, when the use of the entire film was unnecessary. Frequently it was effective for the sound on the film to be cut, so that the instructor might provide a commentary that was more pertinent to his presentation. At times locally produced motion pictures shot especially for a particular purpose were used.

STILL PICTURES, SLIDES, FILMSTRIPS, PHOTOS

Thirty-five mm. slides proved to be very adaptable to TV instruction. Commercially produced slides were available for several courses and were quite acceptable. Many locally produced slides were used to advantage. However, some color slides, especially of biological subjects, did not communicate their message when transmitted in black and white. Gray blood, for example, was not so readily recognized as the more familiar bright red variety.

A white-tipped black pointer was used effectively to point out details on either slides or movies. When the pointer was held against a flat black background, and the picture so obtained was superimposed over the slide or film, only the white point was evident. With very little practice the instructor learned to watch the monitor and point out any portion of the picture to which he wanted to call attention.

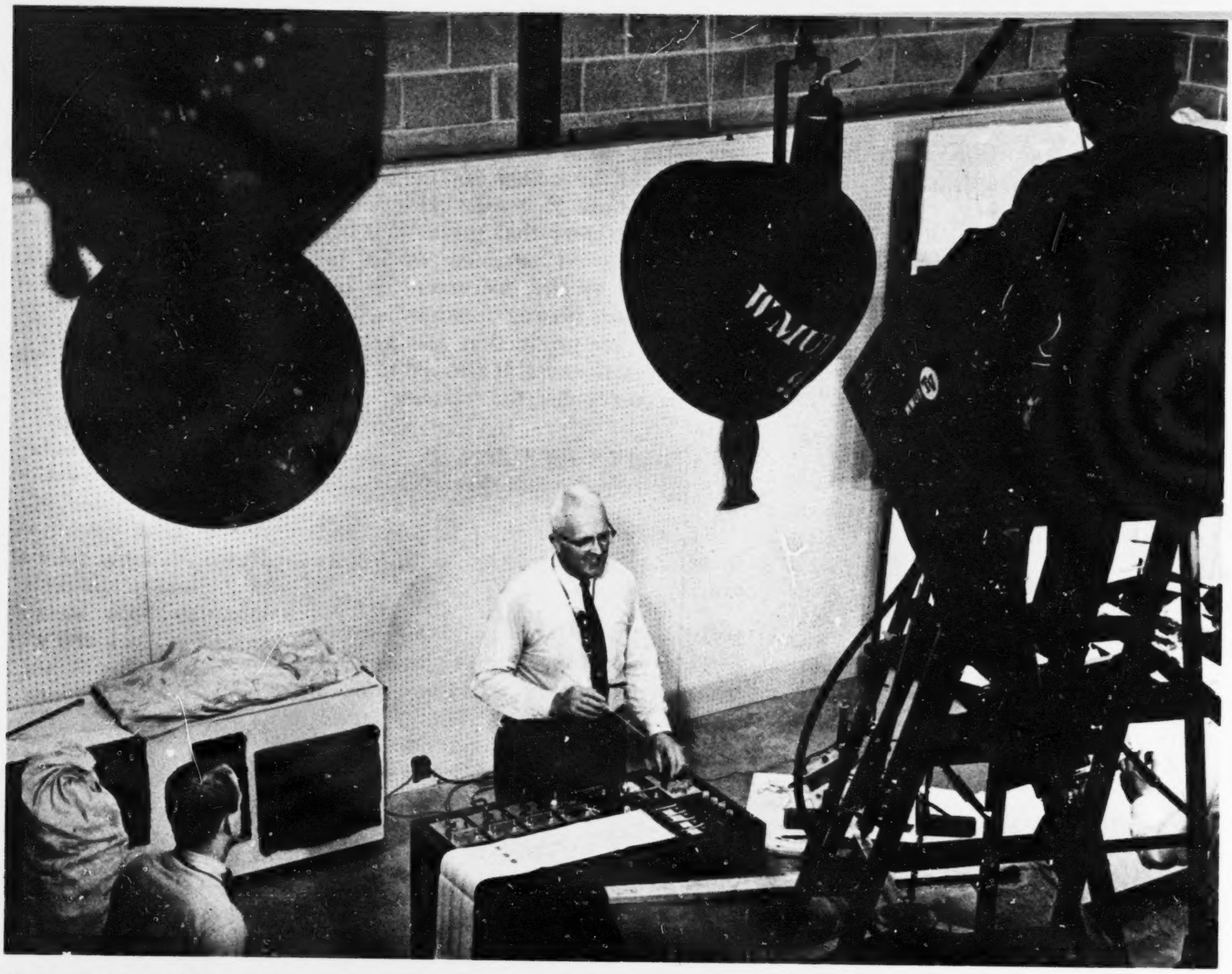
Filmstrips were satisfactorily projected against a screen, and picked up off the screen by the TV camera.

Photographs were mounted to eliminate glare from the lights reflecting into the TV camera. Whenever possible, these were kept to a uniform size, so that camera position could be set and photographs could be flipped if consecutive use was desired. In these, as in all visuals, the 3 by 4 aspect ratio was maintained.

CHARTS AND GRAPHS

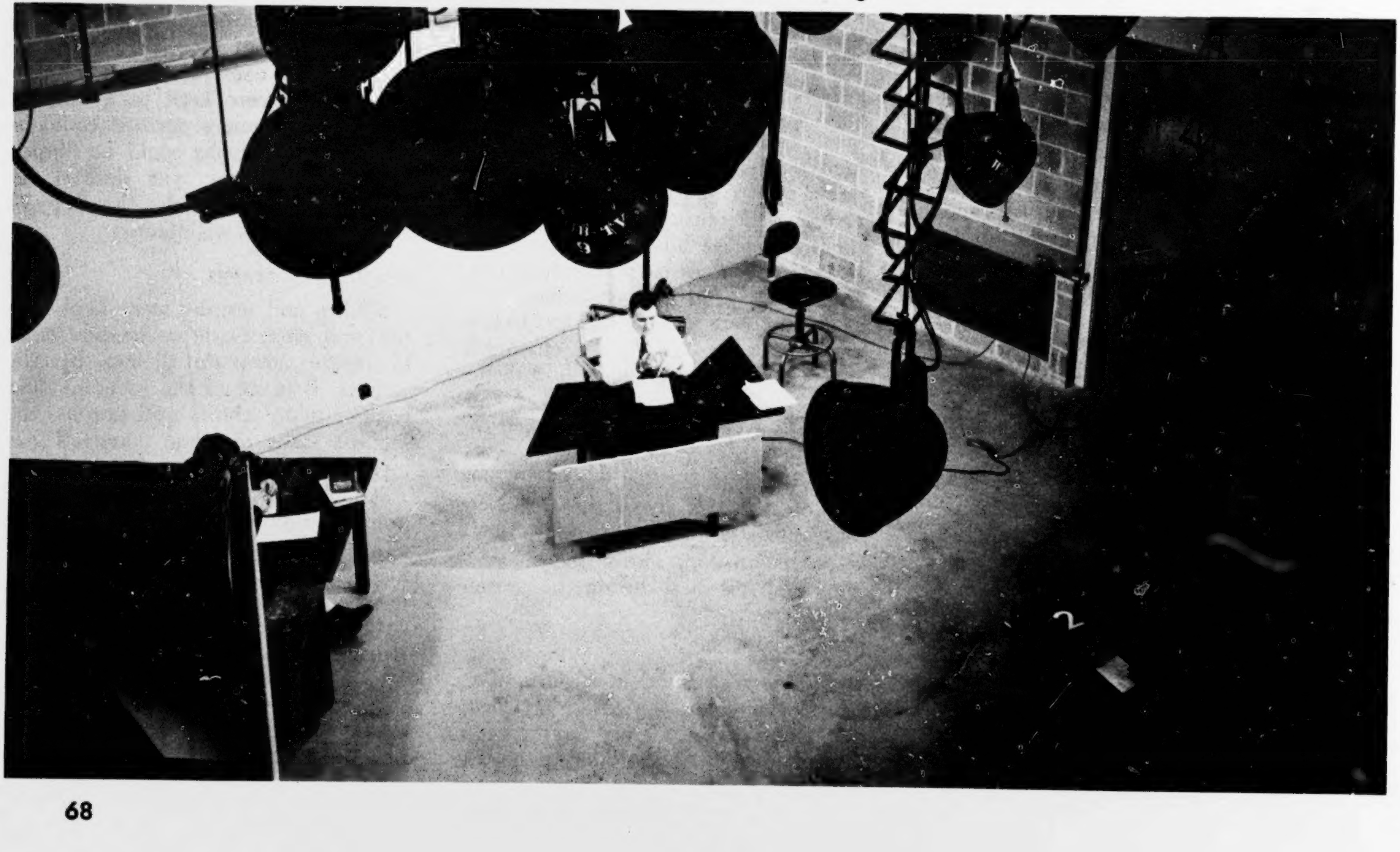
Charts and graphs were kept simple, and were made sufficiently large to insure adequate pickup by the camera. Because of the inherent dullness of many charts and graphs, the interest value of these materials was increased when artwork was included.

An effective way of presenting graphic information was devised. In a course employing extensive use of maps, it was found that the usual means of reproduction did not fulfill one important demand—that the instructor be visible for explanation and interpretation. It was felt that if the material could be expressed in a large enough field, the instructor could physically stand beside or even within



Dr. Walter McNelly demonstrates heart action in a turtle in Physiology 11, 12.

Dr. Howard Berkowitz (below) teaches Foundations of Human Behavior, broadcasting from the small TV studio in Miami's Radio-Television Building.



the graph or chart, and explain it in a more effective manner. The basic pegboard background used for most presentations suggested a technique which used heavy, dark knitting yarn for all outlining. By using dark colored golf tees as outline posts, practically any non-circular shape could be expressed. Thus, the placement of twenty golf tees at the prominent points of the outline of a map of the United States allowed winding of yarn from tee to tee, so that a somewhat stylized but recognizable map of the United States resulted. The necessary information within the map was printed by Embossograph on black flush-trimmed cards, and these were either preset by the floorman, or added as the presentation progressed by the instructor himself. Masonite hooks (#146) were used for fastening items to the pegboard.

In the case of graphs, vertical or horizontal information cards were preset on the pegboard, and the lines of the graph drawn in a manner similar to the outlining of the map, using golf tees and yarn.

A variation of this technique was used in the presentation of charts intended to show "chain of command" or other relationships. It was found workable to fasten a weight to the end of a length of yarn, suspending the weight on the rear of the set wall. The other end of the yarn was then pushed through the pegboard and fastened to a golf tee. At the time the instructor wished to "draw" a line, he pulled the yarn by means of the tee, the yarn being held taut by the weight from behind the set.

MOCK-UPS, MODELS, AND MACHINES

Three-dimensional objects were occasionally shown in perspective, and the use of mock-ups, models, and machines was effective when these could be obtained, and when the cost factor was not prohibitive. Materials for construction were sometimes found around the home: for example, a fairly effective model of chromosome structure was made from coat hanger wire and discarded children's beads and blocks of varying sizes. The cost was negligible.

AUDIO RECORDINGS

Audio recordings were given some use. In a course in sociology the instructor desired to show the way cultural elements change as they move from one people to another. A panel discussion of the growth of jazz in America was developed, and heavy use was made of selected recordings. In a course in physiology, recordings of the human heart were valuable in teaching how the organ functions.

USE OF DRAMA

Only slight experimentation with this technique was done, but results indicate that the use of drama in televised instruction can be quite effective. In a course in educational psychology student actors were rehearsed in scenes demonstrating such behavioral characteristics as displaced aggression or the inferiority complex. Viewers were asked to watch each scene and determine which characteristic was being portrayed. After the scene, students were given a few moments to reach a decision, and were then told what the scene had depicted. Reactions of students to this presentation were favorable.

MAGNET BOARD ANIMATION

A device was developed for the openings of one of the televised classes which offers some promise for low-budget animation in televised instruction. Magnets were affixed to the back of cartoon figures of animals, television cameras, and signs. These were then controlled from the rear of a poster board by other, stronger magnets, and the result was a degree of animation, depending on the talent of the operator.

CELLULOID "CRAWL"

In a course wherein it was desirable to quote at considerable length from written material, it seemed desirable to provide some kind of visual orientation to the quotations. One method employed was that of lettering with red or black wax pencil on a roll of celluloid. The resulting transparent crawl was then pulled past a rear-illuminated glass plate. The advantage of this method over a drum-mounted crawl was the ease of lettering with wax pencil on celluloid and the ease of storing in inexpensive mailing tubes.

DEMONSTRATIONS

Demonstrations—especially in the sciences—were frequent and were used with good results. For example, dissections of very small animal parts to show organic structure were accomplished; vivisections of dogs were performed, showing in action most of the important internal organs of the mammal. Demonstrations of child behavior were accomplished by bringing children of different age groups into the studio, providing them with toys, and eavesdropping on their play while the professor interviewed their mothers about them.

PRESENTING COURSE VOCABULARY

More flexibility was offered in televised courses compared to conventional courses for the presentation of vocabulary peculiar to the subject. Although the blackboard was often used for this purpose, hand or machine lettered words were frequently more effective. Good results were also produced with embossograph cards. White letters were mounted on black cards and these were placed against a black background; then the picture so obtained was superimposed over the chest of the instructor as he introduced the word. Under these circumstances, some instructors found it desirable to look at the monitor and partition the word—break it into its parts to point out its derivation and make clear its meaning.

Another technique was that of putting preprinted words on the blackboard itself, with the use of Ree-Stik, a commercial adhesive that (if used correctly) does not mar the blackboard and permits words to be removed readily. With this adhesive it was possible to use fairly heavy stock and still achieve firm adhesion. Against a blackboard, white or black letters on dark gray stock or white letters on black stock were very acceptable.

Sometimes it was necessary to make letters in a hurry. A very usable white letter was obtained by applying Esquire white shoe polish ("Skuff-Kote") in a Speed-Ball lettering pen. However, as a permanent letter, this was not acceptable, as it rubbed off in time.

PROBLEM OF STUDENT-TEACHER CONTACT

The problem of student-teacher contact was approached in several different ways. Initially it was felt by one professor that the lack of students in the room with him would be an impediment to his teaching. Therefore, a small group of students was present in the originating studio during the first semester of televised instruction. It was noted, however, that the teacher tended to talk to the students who were with him, and frequently forgot to look into the camera. Students in the viewing rooms felt neglected. The studio group was eliminated in subsequent presentations of this class at the professor's own suggestion.

The use of an hour and a half class period twice a week, rather than the three conventional 50 minute periods, has allowed for an effective arrangement. The instructor's TV presentation normally was 50 minutes in length, then a short "break" followed by a discussion period led by graduate assistants in the receiving rooms. At other times a film or demonstration was followed by a short recess during which students wrote out questions. These questions were then answered during the final part of the class.

In most of the televised classes it was believed that an orientation of the student to the TV studio would be desirable. Accordingly, the first class session usually included a look behind the cameras and into the control rooms and a comprehensive view of the studio in which the instructor taught. In addition, students were usually invited to an open house at the TV studio, so they could get better oriented to the learning situation.

PREPARATION OF SPECIAL VISUALS

Careful planning far in advance of a presentation was necessary, to allow sufficient time for the preparation of special visual materials. These visuals usually were made by the Audio-Visual Service, necessitating close cooperation between the director of the course involved and the artist producing the visual materials. It generally was desirable to have the director receive ideas from the instructor and communicate them to the artist. Thus, it was frequently possible to anticipate things that might restrict TV production or impair the effectiveness of the visual when presented over television.

INTRODUCTION TO THE PRESENTATION

It is a recognized tenet of good communication that one must attract attention before he presents information. The application of this maxim to televised education is obvious when one considers that the instructor doesn't know when he begins broadcasting whether students are in their seats, ready to take notes, or whether there has been some distraction in the viewing room. Accordingly, in some classes instructors attempted to utilize humor at the beginning of their presentation; in others, standardized formats were employed (using film materials, theme music, or other elements of a consistent duration) to warn the viewer that the course proper was about to begin.

THE COST FACTOR IN TELEVISED TEACHING

The per pupil cost in televised teaching is subject to so many variables that its discussion becomes almost meaningless unless a complete analysis of the teaching situation is provided. For instance, to televise a course with a professional studio crew at union wages and with some $300,000 worth of equipment with high depreciation and maintenance costs could well make TV teaching prohibitive for less than 600 to 800 student enrollments; however, a course telecast with $30,000 in equipment and with a student studio crew might be economically feasible for some 200 to 300 students. The academic rank, and hence the salaries, of the TV teacher and director and the monitors in the classrooms materially affect the cost and consequently the number of students which is necessary to reach a "break-even" point compared with conventional classes taught by qualified personnel. Statistics kept during the academic year of 1956-1957 indicated that with the equipment and personnel then used it would be necessary to enroll 250 to 275 students in each televised course to justify the use of television on a strictly per pupil cost basis. This break-even point will approximate 300 in the present academic year, 1959-1960, due partly to increased equipment costs for open circuit telecasting and partly to normal educational cost increases.

Radio-TV building at Miami University

APPENDICES

The Appendices which follow have been numbered in a unique fashion to facilitate reference to the appropriate section of the text. Each Appendix is identified by a pair of roman numerals. The first numeral of the pair indicates the chapter of the Report to which the appendixed data pertain. The second numeral indicates the sequential position of the Appendix. Thus, *Appendix IV-I* is the first Appendix relatingto Chapter IV, *Appendix IV-II* is the second Appendix relating to Chapter IV, etc.

A complete listing of all tabular appendices and the tables contained within each is given below:

Appendix III-I. Critical Thinking and Synthesis Examinations.
  Table 1. Characteristics of critical thinking and synthesis examinations (1956-1957).
  Table 2. Agreement between readers responsible for grading themes in Composition and Literature.

Appendix IV-I. Comparative Performance on Tests of Subject Matter Achievement by Students in Experimental and Control Sections.
  Table 1. Comparisons between TV and Control sections.
  Table 2. Comparisons between LC and Control sections.
  Table 3. Comparisons between IS and Control sections.
  Table 4. Comparisons between GS and Control sections.

Appendix IV-II. Comparative Performance on Tests of Problem Solving and Synthesis by Students in Experimental and Control Sections.
  Table 1. Courses for which pretest data were not available.
  Table 2. The course (Composition and Literature) for which pretest data were available.

Appendix IV-III. Comparative Scores on Stereotype and Misconception Tests.

Appendix IV-IV. Acquisition of Subject-Matter Knowledge as a Dual Function of Section Assignment and Level of Ability.
  Table 1A. TV Courses by semester.
  Table 1B. TV Courses across years.
  Table 2A. LC Courses by semester.
  Table 2B. LC Courses across years.
  Table 3. IS Courses by semester.
  Table 4A. GS Courses by semester.
  Table 4B. GS Courses across years.

Appendix IV-V. Performance on Tests of Problem Solving and Synthesis as a Dual Function of Section Assignment and Level of Ability.

Appendix IV-VI. Long Term Retention Study.
  Table 1. The samples.
  Table 2. Summary of ACE and Retention Test scores.

Appendix V-I. Student Attitudes Toward the Course Content.
  Table 1. Comparative scores on the C-Scale of students in the experimental and control sections of each course.
  Table 2. Attitude toward the course content as a dual function of section assignment and academic ability (1957-1958).
  Table 3. Responses to "motivational" items from the C-Scale.

Appendix V-II. Student Attitudes Toward the Instructor.
  Table 1. Comparative scores on the I-Scale of students in the experimental and control sections of each course.
  Table 2. Attitude toward the instructor as a dual function of section assignment and academic ability (1957-1958).
  Table 3. Responses to specific items from the I-Scale.

APPENDIX III-I—TABLE 1

Characteristics of Critical Thinking and Synthesis Examinations (1956-1957)

Test	*Scoring*	*Average correlation with objective Final Examination*	*Correlation between graders*[1]	*Kuder-Richardson No. 21 Reliability*[2]
Critical Thinking in Social Science	Objective	.53		.72
Reasoning and Understanding —Natural Sciences	Objective	.48		.73
Reasoning and Understanding —Biological Sciences	Objective	.38		.68
Marketing Case Study				
Test No. 1	Essay	----*	.63	
Test No. 2	Essay	----*	.64	
Test No. 3	Essay	----**	.54	
Business and Government Case Study	Essay	.00	.94	
Synthesis in Sociology	Essay	.63	.70	
Synthesis in Economics				
Test No. 1	Essay	----*	.92	
Test No. 2	Essay	.60	.95	
Test No. 3	Essay	.65	.77	
English Themes				
First Semester	Essay	.46	----***	
Second Semester	Essay	.35	----***	

[1] Inter-grader reliability for two readers is reported for all essay tests except Sociology. The correlation in the case of Sociology is an average of the intercorrelation between three readers.

[2] Kuder-Richardson reliabilities are reported for objective examinations.

* Administered prior to the end of the course.

** This test was itself the final examination.

***Reported in Appendix III-I, Table 2.

APPENDIX III-I—TABLE 2

Agreement Between Two Readers Responsible for Grading Themes in Composition and Literature

Subscore	*Semester*	*Year*	*Disparity Between Grade Assignment*[1]		
			1 Grade or less	*1.1 to 2 Grades*	*More than 2 Grades*
Organization	1	56-57	63%	26%	11%
	2	56-57	82	18	00
	1	57-58	76	21	03
	2	57-58	71	24	05
Sentences and Diction	1	56-57	78	19	03
	2	56-57	92	08	00
	1	57-58	88	12	00
	2	57-58	82	18	00
Content	1	56-57	57	34	09
	2	56-57	88	12	00
	1	57-58	88	10	02
	2	57-58	84	13	03
Overall Grade	1	56-57	71	27	02
	2	56-57	90	10	00
	1	57-58	82	18	00
	2	57-58	85	12	03

[1] Grades were assigned on the usual five-letter continuum.

APPENDIX IV-I—TABLE 1

Summary of Scores on Subject-Matter Objective Tests in TV and Control Sections

Course	*Section*	*Year*	*First Semester*				*Second Semester*			
			N	*S.D*	*M*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
Foundations of Human Behavior	TV	55-56					97	16.03	123.76	0.25
	C	55-56					62	15.05	123.11	
	TV	56-57	160	15.72	113.98	1.00	140	19.15	145.10	2.21*
	C	56-57	32	13.80	116.88		27	14.53	153.56	
	TV	57-58	186	11.29	73.47	0.90	159	9.41	83.58	0.27
	C	57-58	32	8.71	75.06		29	6.69	83.97	
	TV	58-59	186	10.98	80.10	0.62	104	7.51	85.76	1.54
	C	58-59	34	11.84	81.47		23	11.01	81.96	
Human Physiology	TV	55-56					90	31.33	208.92	0.66
	C	55-56					30	26.44	204.59	
	TV	56-57	191	8.61	60.83	1.44	137	8.21	74.67	0.49
	C	56-57	36	9.70	63.14		27	9.29	75.63	
Air Science Part I	TV	56-57	98	6.68	61.43	0.74	79	9.27	73.60	0.66
	C	56-57	31	7.65	60.97		27	8.87	74.96	
Part II	TV	56-57	98	10.98	92.61	0.00	79	8.63	67.98	2.69**
	C	56-57	31	13.72	92.55		27	9.28	73.33	
Part I	TV	57-58	104	11.23	82.09	0.98	70	4.44	35.09	1.69
	C	57-58	19	8.38	84.32		18	5.05	32.83	
Part II	TV	57-58	104	11.64	71.93	0.82	70	5.88	34.63	0.83
	C	57-58	19	9.59	74.00		18	4.60	35.72	
Sociology	TV	55-56					131	20.91	110.09	0.24
	C	55-56					129	16.90	109.53	
Biology	TV	55-56					183	15.21	253.97	3.00**
	LC	55-56					177	15.76	248.66	
Economics	TV	56-57	141	5.20	35.54	1.51	112	5.54	34.05	3.04**
	C	56-57	48	4.14	36.81		40	5.48	36.93	
Zoology	TV	57-58	148	2.18	6.09¶	0.16	127	23.66	132.64	0.38
	LC	57-58	66	2.06	6.04¶		57	19.70	131.37	
Government	TV	58-59	51	8.90	33.98	0.27	31	12.93	80.06	0.58
	LC	58-59	61	6.88	33.56		34	12.94	78.18	

* $p < .05$
**$p < .01$
¶Final grade

APPENDIX IV-I—TABLE 2

Summary of Scores on Subject Matter Objective Tests in LC and Control Sections

Course	*Section*	*Year*	*First Semester*				*Second Semester*			
			N	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
Business and Government	LC	55-56					105	8.58	70.03	0.70
	C	55-56					30	7.65	71.28	
	LC	56-57	81	9.41	65.31	0.50	53	7.18	67.68	0.16
	C	56-57	26	8.42	64.27		25	10.29	67.20	
Composition and Literature	LC	55-56					37	5.59	28.94	1.33
	C	55-56					37	4.74	30.78	
	LC	56-57	138	5.18	34.66	0.50	99	6.56	39.76	1.44
	C	56-57	84	5.26	34.06		52	5.65	41.31	
	LC	57-58	157	7.18	51.49	0.12	120	9.62	69.53	0.28
	C	57-58	90	7.08	50.19		61	8.85	69.93	
	LC	58-59	66	5.36	32.59	2.07*				
	C	58-59	46	5.78	30.35					
Accelerated Composition and Literature	LC	58-59	84	6.27	38.12	2.64*				
	C	58-59	49	5.30	40.84					
Geography	LC	55-56					88	10.59	79.83	0.83
	C	55-56					85	9.56	78.54	
	LC	56-57	296	10.53	71.88	1.10	207	9.52	70.01	0.23
	C	56-57	74	11.20	73.18		42	10.23	69.93	
	LC	57-58	70	12.71	66.39	0.95	50	10.47	65.92	4.06**
	C	57-58	24	10.41	68.92		20	7.35	75.10	
Psychology	LC	55-56					77	15.93	109.45	1.77
	C	55-56					30	21.77	102.52	
	LC	56-57	88	21.14	97.44	0.47	56	15.09	106.75	0.95
	C	56-57	53	15.34	98.96		30	8.66	109.63	
Psychology	LC	57-58	103	17.00	100.63	1.06	76	12.57	107.51	0.36
	C	57-58	26	11.53	103.65		23	13.25	106.39	
Economics	LC	56-57	157	4.89	35.82	0.02	90	6.25	35.98	0.87
	C	56-57	64	4.28	35.84		32	5.90	37.27	
Chemistry	LC	56-57	134	29.67	115.38	1.06	92	28.95	78.92	0.09
	C	56-57	23	33.41	123.00		16	33.45	78.12	
	LC	57-58	172	32.59	103.00	0.46	129	36.30	115.40	1.21
	C	57-58	25	33.92	99.60		19	32.95	105.26	
Sociology	LC	56-57					58	18.93	176.81	0.49
	C	56-57					30	22.93	174.43	

continued

APPENDIX IV-I—TABLE 2 continued

Summary of Scores on Subject Matter Objective Tests in LC and Control Sections

Course	*Section*	*Year*	*First Semester*				*Second Semester*			
			N	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
Government 241	LC	56-57	39	11.21	74.23	0.47				
	C	56-57	17	8.97	75.71					
Mathematics	LC	56-57	77	15.41	59.47	0.31	42	4.71	14.05	0.57
	C	56-57	65	15.10	58.94		36	4.07	13.47	
Physics	LC	56-57	73	15.86	69.47	0.00	93	10.84	74.34	0.34
	C	56-57	33	18.99	69.48		24	13.58	75.38	
Zoology	LC	56-57	135	13.47	62.77	0.18	102	13.01	64.04	2.30*
	C	56-57	64	13.46	63.16		47	11.25	69.15	
Classics	LC	56-57	49	11.55	82.10	1.33				
	C	56-57	32	8.55	85.16					
Elementary French	LC	56-57	31	13.07	93.39	0.16				
	C	56-57	19	11.18	92.84					
Secondary French	LC	57-58	43	26.83	197.77	1.04				
	C	57-58	27	28.69	190.52					
Government 11	LC	57-58	62	6.54	39.63	1.67	54	5.73	33.33	0.62
	C	57-58	26	9.74	36.08		19	5.59	32.37	
Social Studies	LC	56-57	50	14.24	51.16	1.58	30	14.94	71.27	0.33
	C	56-57	38	11.84	55.74		30	13.96	70.03	
	LC	57-58	65	16.48	75.49	1.24	50	22.67	93.32	1.25
	C	57-58	55	17.67	79.42		53	18.52	98.51	
	LC	58-59	86	15.97	87.05	0.38	53	15.34	82.64	1.70
	C	58-59	49	15.79	88.14		31	15.72	87.68	

*$P < .05$

APPENDIX IV-I—TABLE 3

Summary of Scores on Subject-Matter Objective Tests in IS and Control Sections

Course	*Section*	*Year*	*First Semester*				*Second Semester*			
			N	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
Government 241	IS	57-58	28	9.83	74.68	1.27	21	7.36	61.24	0.18
	C	57-58	27	8.48	77.89		22	4.56	61.59	
History	IS	58-59	21	31.38	165.14	0.12				
	C	58-59	64	30.64	164.19					

APPENDIX IV-I—TABLE 4

Summary of Scores on Subject Matter Objective Tests in GS and Control Sections

Course	Section	Year	First Semester N	First Semester S.D.	First Semester Mean	First Semester t-ratio	Second Semester N	Second Semester S.D.	Second Semester Mean	Second Semester t-ratio
Introduction to Business	GS	56-57	151	16.25	102.84	0.26	96	14.09	110.63	0.56
	C	56-57	138	15.28	103.18		104	14.40	111.77	
	GS	57-58	481	12.12	67.41	0.72	303	10.21	102.64	1.82
	C	57-58	28	11.56	69.07		22	11.31	107.27	
	GS	58-59	344	13.49	111.42	0.71	272	14.31	113.42	0.34
	C	58-59	45	12.72	112.87		48	10.17	114.00	
Geology	GS	56-57	117	10.17	64.02	2.06*	70	10.32	58.26	1.61
	C	56-57	30	10.45	68.37		19	7.60	62.79	
	GS	57-58	202	10.67	69.72	2.05*	146	9.31	63.36	3.20**
	C	57-58	33	9.07	73.42		27	9.71	69.93	
	GS	58-59	245	9.36	72.06	0.23	167	9.37	69.66	1.48
	C	58-59	20	10.04	72.60		25	8.75	72.52	
Composition and Literature	GS	58-59	96	6.89	32.63	2.00*				
	C	58-59	46	6.04	30.35					

*p < .05

**p < :01

APPENDIX IV-II—TABLE 1

Comparative Scores on Tests of Problem Solving and Synthesis

Course	Test	Year	Section	N	S.D.	Mean	t-ratio
Foundations of Human Behavior	Critical thinking in Social Science	56-57	TV	138	7.45	29.10	0.19
		56-57	C	25	7.01	29.40	
Physiology	Biological Science	56-57	TV	134	5.30	27.54	0.75
		56-57	C	22	6.93	26.36	
Economics	Essay #1	56-57	TV	139	15.45	38.45	2.49**
		56-57	C	47	12.08	44.66	
	Essay #2	56-57	TV	141	11.11	31.84	3.09**
		56-57	C	48	9.79	37.44	
	Essay #3	56-57	TV	112	9.27	31.83	1.84
		56-57	C	41	8.48	34.56	
Zoology	Biological Science	57-58	TV	113	6.45	28.78	1.94
		57-58	LC	41	5.35	30.80	

continued

APPENDIX IV-II—TABLE 1 continued

Comparative Scores on Tests of Problem Solving and Synthesis

Course	*Test*	*Year*	*Section*	*N*	*S.D.*	*Mean*	*t-ratio*
Economics	Essay #1	56-57	LC	157	11.96	42.90	2.12*
		56-57	C	64	11.14	46.86	
	Essay #2	56-57	LC	157	9.81	34.37	0.64
		56-57	C	64	8.38	33.47	
	Essay #3	56-57	LC	90	10.92	31.12	0.29
		56-57	C	21	6.72	30.38	
Physics	Natural Science	56-57	LC	84	6.72	33.87	0.06
		56-57	C	22	7.55	33.77	
Psychology	Natural Science	56-57	LC	54	6.08	32.65	0.49
		56-57	C	30	6.60	31.93	
Social Studies	Social Science	56-57	LC	31	4.91	33.55	0.93
		56-57	C	30	6.64	34.97	
Zoology	Biological Science	56-57	LC	51	6.46	29.24	0.45
		56-57	C	42	5.91	29.83	
Sociology	Social Science	56-57	LC	58	6.67	31.81	0.36
		56-57	C	30	7.47	32.40	
	Synthesis-essay	56-57	LC	58	9.96	66.31	0.68
		56-57	C	29	9.53	67.83	
Chemistry	Natural Science	57-58	LC	65	6.87	30.74	1.01
		57-58	C	11	4.95	32.55	
Marketing	Case 2	56-57	LC	35	7.49	75.57	0.33
		56-57	C	24	8.27	74.88	
	Case 3	56-57	LC	36	6.99	74.31	0.07
		56-57	C	26	6.08	74.42	
	Case 2	57-58	LC	44	2.22	6.10	2.21*
		57-58	C	25	1.60	7.14	
	Case 3	57-58	LC	44	2.17	5.55	0.39
		57-58	C	25	2.65	5.80	
	Case 3	58-59	LC	28	2.13	6.73	1.54
		58-59	C	18	1.84	7.67	
Business and Government	Case	56-57	LC	148	49.32	98.41	0.04
		56-57	C	54	55.77	98.72	

* $p < .05$

** $p < .01$

APPENDIX IV-II—TABLE 2

Comparative Scores on Tests of Synthesis in Composition and Literature

		1956-1957						1957-1958					
			Pretest		Posttest				Pretest		Posttest		
Test	*Sec.*	*N*	*S.D.*	*Mean*	*S.D.*	*Mean*	*F-ratio*¶	*N*	*S.D.*	*Mean*	*S.D.*	*Mean*	*F-ratio*¶
Theme: 1st Semester													
Mechanics	LC	80	13.02	70.23	12.39	74.25	0.04	77	12.19	75.78	11.69	79.44	0.27
	C	43	12.30	70.07	13.51	74.63		72	11.99	75.68	10.19	79.64	
Organization	LC	80	8.80	69.45	9.18	74.50	0.65	77	8.49	74.78	8.03	79.98	1.97
	C	43	8.88	70.72	7.66	73.67		72	8.49	76.28	7.83	79.58	
Content	LC	80	7.97	70.44	9.00	74.78	0.40	77	7.19	77.24	7.39	79.21	0.06
	C	43	7.36	70.35	8.59	73.72		72	6.99	78.28	6.56	80.77	
Effective Sent. and Diction	LC	80	7.99	70.60	6.85	74.39	0.19	77	8.56	75.11	7.63	80.01	6.63*
	C	43	7.73	70.42	8.19	73.77		72	7.83	78.21	8.16	80.21	
Overall Grade	LC	80	8.41	66.59	9.31	72.09	1.06	77	9.19	71.45	9.22	76.65	1.40
	C	43	8.57	67.84	9.74	71.21		72	9.79	73.68	9.06	77.84	
Theme: 2nd Semester													
Mechanics	LC	70	10.52	72.59	9.93	73.55	0.90	58	8.19	86.10	9.39	85.07	1.28
	C	38	9.60	73.45	10.64	75.04		44	9.12	83.97	8.13	84.34	
Organization	LC	70	5.46	71.50	7.27	71.76	1.02	58	5.86	74.68	4.73	73.58	1.30
	C	38	5.89	69.67	8.70	74.13		44	6.79	73.28	4.46	75.31	
Content	LC	70	7.60	70.30	7.04	72.53	1.10	58	4.70	75.65	4.56	76.91	2.33
	C	38	6.16	70.34	8.26	74.13		44	7.09	75.15	6.63	75.54	
Effective Sent. and Diction	LC	70	6.74	73.37	6.24	73.73	2.63	58	5.99	73.12	5.00	73.85	0.13
	C	38	7.39	73.08	7.64	75.47		44	5.76	72.82	5.96	74.68	
Overall Grade	LC	70	6.95	68.09	8.02	70.51	1.54	58	5.69	72.65	5.23	73.02	0.35
	C	38	7.10	68.95	8.47	72.82		44	6.06	68.45	6.33	69.25	

¶Analysis of Covariance controlling on pretest score

*$p < .05$

APPENDIX IV-III

Comparative Scores on Stereotype and Misconception Tests

Course	*Year*	*Section*	*N*	*Pretest*		*Posttest*		*Covariance¶ F-ratio*
				S.D.	*M*	*S.D.*	*M*	
Social Studies	56-57	LC	33	0.48	3.58	0.50	3.78	1.82
		C	29	0.41	3.46	0.50	3.57	
Business & Government	56-57	LC	114	7.90	83.96	7.58	86.73	2.26
		C	51	7.65	83.24	7.60	88.61	
Psychology	56-57	LC	55	2.70	24.22	2.39	26.16	7.43*
		C	28	2.77	23.57	1.67	26.79	
	57-58¶	LC	69	6.73	56.70	6.21	66.64	0.39
		C	23	7.46	58.30	4.50	67.83	
Educational Psychology	57-58	TV	143	11.69	55.97	8.61	61.21	0.01
		C	24	5.02	60.33	4.91	65.42	

¶The number of "scored" items was increased on this form of the test from thirty (in the '56-'57 form) to 78.

*P $<$ .01

APPENDIX IV-IV--TABLE 1A

Acquistion of Subject-Matter Knowledge as a Dual Function of Section Assignment and Level of Ability: TV Courses by Semester

Course	*Sem.*	*Year*	*Section*	*High Ability Subgroup (ACE—50% ile and Above)*			*t-ratio*	*Low Ability Subgroup (ACE—49% ile and Below)*			*t-ratio*
				N	*S.D.*	*Mean*		*N*	*S.D.*	*Mean*	
Educational Psychology	2	55-56	TV	43	29.74	126.28	0.34	43	16.06	115.81	1.37
			C	26	13.92	128.38		29	14.77	120.96	
	1	57-58	TV	97	9.19	78.04	0.11	80	11.60	68.28	2.06*
			C	15	9.70	77.73		17	6.84	72.70	
	2	57-58	TV	89	7.49	87.06	0.03	69	9.74	79.09	0.97
			C	14	5.48	87.00		15	6.52	81.13	
	1	58-59	TV	113	9.51	83.74	1.02	73	10.97	74.47	0.14
			C	21	5.98	85.38		13	15.64	75.15	
Sociology	2	55-56	TV	55	13.13	117.80	0.97	46	14.67	103.04	0.12
			C	67	12.60	115.52		40	9.54	102.70	

continued

APPENDIX IV-IV—TABLE 1A continued

Acquistion of Subject-Matter Knowledge as a Dual Function of Section Assignment and Level of Ability: TV Courses by Semester

Course	Sem.	Year	Section	High Ability Subgroup (ACE—50% ile and Above)				Low Ability Subgroup (ACE—49% ile and Below)			
				N	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
Economics	1	56-57	TV	78	5.04	36.82	0.76	63	4.99	33.95	0.68
			C	32	3.94	37.78		16	3.76	34.88	
	2	56-57	TV	85	4.62	36.31	1.11	72	3.40	35.25	1.07
			C	33	3.78	37.45		31	4.85	34.13	
Physiology	2	55-56	TV	37	29.34	221.70	0.41	39	29.20	197.87	0.25
			C	11	19.27	217.73		17	27.28	195.76	
Zoology	1	57-58	TV	97	2.05	6.58¶	0.04	47	1.96	5.09¶	1.09
			LC	48	2.03	6.54¶		18	1.46	4.69¶	
	2	57-58	TV	90	24.24	135.20	0.50	37	20.91	126.41	0.10
			LC	43	21.07	133.14		14	13.40	125.93	
Government	1	58-59	TV	38	8.86	36.08	1.56	13	5.41	27.85	2.78*
			LC	44	7.00	33.27		17	6.89	34.29	

*p < .05

¶Letter grade conversions wherein 3.00 = D, 6.00 = C, 9.00 = B, etc.

APPENDIX IV-IV—TABLE 1B

Acquisition of Subject-Matter Knowledge as a Dual Function of Section Assignment and Level of Ability: TV Courses Across Years

Course	Sem.	Section	High Ability Subgroup (ACE 75% ile and Above)				Low Ability Subgroup (ACE 25% ile and Below)			
			N	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
Educational	Fall	TV	111	7.25	55.24	0.54	58	10.33	41.78	0.17
Psychology	Fall	C	22	6.42	56.09		12	9.51	42.33	
	Spring	TV	98	8.87	53.42	0.53	59	9.47	41.69	2.68*
	Spring	C	36	8.57	54.33		23	9.81	51.78	
Physiology	Spring	TV	59	9.50	54.18	0.16	47	8.84	47.42	2.18*
	Spring	C	15	9.16	53.73		13	6.48	43.54	
Zoology	Spring	TV	43	10.71	55.81	3.02*	33	10.96	46.12	2.52*
	Spring	LC	48	10.77	50.77		36	10.54	39.50	

*p < .05

APPENDIX IV-IV—TABLE 2A

Acquisition of Subject-Matter Knowledge as a Dual Function of Section Assignment and Level of Ability: LC Courses by Semester

				High Ability Subgroup (ACE—50% ile and Above)				*Low Ability Subgroup (ACE—49% and Below)*			
Course	*Sem.*	*Year*	*Section*	*N*	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
Composition & Literature	2	55-56	LC	14	2.79	32.43	0.06	22	5.57	26.73	2.09*
			C	15	5.29	32.33		22	3.95	29.73	
	1	56-57	LC	95	3.99	36.64	1.48	43	4.82	30.28	0.87
			C	60	4.45	35.62		24	5.02	30.17	
	2	56-57	LC	76	8.96	39.55	2.22*				
			C	44	5.24	42.43					
	1	57-58	LC	115	5.54	43.60	1.16	42	6.71	34.38	0.92
			C	67	6.78	42.46		19	5.96	36.00	
	2	57-58	LC	90	5.53	43.84	0.18				
			C	55	4.61	43.68					
	1	58-59	LC	35	5.55	33.60	0.62	31	4.72	31.45	2.43*
			C	27	6.54	32.04		19	4.92	27.95	
Geography	2	55-56	LC	42	9.19	83.81	1.14	43	10.49	76.11	0.22
			C	41	8.32	81.59		45	9.80	75.63	
	1	56-57	LC	151	9.24	75.14	0.41	145	9.62	68.83	0.44
			C	42	10.45	75.74		32	11.34	69.81	
	2	56-57	LC	115	8.86	71.49	0.04	92	9.60	68.17	0.06
			C	23	9.90	71.78		19	9.92	67.68	
Psychology	2	55-56	LC	44	13.98	113.02	1.03				
			C	18	17.69	108.61					
	1	56-57	LC	54	17.27	103.11	0.14	34	20.39	89.21	0.57
			C	34	12.48	102.62		19	17.08	92.42	
	1	57-58	LC	68	13.46	106.75	0.28				
			C	16	11.07	107.63					
	2	57-58	LC	54	18.59	109.69	0.27				
			C	16	13.20	108.56					
Zoology	1	56-57	LC	75	11.89	68.35	0.43	60	11.98	55.80	0.19
			C	36	10.53	69.31		28	12.69	55.25	
	2	56-57	LC	62	14.06	72.84	0.02				
			C	30	8.00	72.80					
Mathematics	1	56-57	LC	39	12.14	68.33	1.45	38	12.95	50.37	1.05
			C	35	16.00	63.49		30	11.97	53.63	
Chemistry	1	57-58	LC	130	30.95	108.86	0.87				
			C	19	33.23	101.63					
	2	57-58	LC	102	37.20	117.95	0.31				
			C	15	33.60	108.47					
French	1	57-58	LC	35	25.80	200.09	1.06				
			C	23	28.37	192.17					
Introductory Government	1	57-58	LC	40	5.83	40.55	0.40				
			C	16	6.14	39.81					
	2	57-58	LC	35	5.35	33.74	0.43				
			C	13	5.71	32.92					

continued

APPENDIX IV-IV—TABLE 2A continued

Acquisition of Subject-Matter Knowledge as a Dual Function of Section Assignment and Level of Ability: LC Courses by Semester

				High Ability Subgroup (ACE—50% ile and Above)				Low Ability Subgroup (ACE—49% and Below)			
Course	*Sem.*	*Year*	*Section*	*N*	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
Social Studies	1	57-58	LC	33	18.85	78.82	1.21	32	12.70	72.06	0.21
			C	31	17.85	84.48		24	15.10	72.88	
	2	57-58	LC	28	23.60	99.89	0.70	22	18.33	84.95	1.06
			C	31	14.89	103.58		22	20.68	91.36	
	1	58-59	LC	43	15.74	91.28	0.06	43	15.64	82.81	0.34
			C	24	16.98	91.63		25	12.71	84.80	
	2	58-59	LC	30	15.83	88.43	0.63	23	15.11	75.09	1.83
			C	15	16.60	91.73		16	13.87	83.87	
Business & Government	2	55-56	LC	49	8.06	70.86	0.81	51	6.93	69.02	0.31
			C	14	8.14	72.86		15	8.89	69.80	

*$p < .05$

APPENDIX IV-IV—TABLE 2B

Acquisition of Subject-Matter Knowledge as a Dual Function of Section Assignment and Level of Ability: LC Courses Across Years

			High Ability Subgroup (ACE—75% ile and Above)				Low Ability Subgroup (ACE—25% ile and Below)			
Course	*Sem.*	*Section*	*N*	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
Chemistry	Fall	LC	129	9.65	53.09	0.54				
		C	20	8.85	54.00					
	Spring	LC	109	10.42	52.58	0.94				
		C	20	11.29	50.80					
Business and Government	‡	LC	55	10.20	52.74	0.48	44	9.84	47.50	0.12
		C	18	11.68	53.72		19	9.63	47.26	
Psychology	Fall	LC	54	7.44	56.94	1.02	22	9.19	38.82	2.23*
		C	29	6.10	55.37		11	7.76	45.91	
	Spring	LC	72	8.54	54.61	1.43	25	10.34	40.56	0.00
		C	37	8.57	52.10		11	15.90	40.55	
Geography	Fall	LC	63	7.70	54.86	0.53	59	9.99	45.12	0.48
		C	17	9.70	53.47		20	10.45	43.80	
	Spring	LC	72	9.25	54.47	0.44	63	9.54	45.22	0.33
		C	27	7.36	55.26		35	10.00	45.91	
English	Fall	LC	137	7.30	55.66	0.09	51	9.01	39.84	0.52
		C	83	6.99	55.57		20	10.43	41.25	
	Spring	LC	111	8.46	53.94	0.31				
		C	59	8.02	54.35					

‡ a one-semester course

*$p < .05$

APPENDIX IV-IV—TABLE 3

Acquisition of Subject-Matter Knowledge as a Dual Function of Section Assignment and Level of Ability: IS Courses by Semester

				High Ability Subgroup (ACE–50% ile and Above)				Low Ability Subgroup (ACE–49% ile and Below)			
Course	Sem.	Year	Section	N	S.D.	Mean	t-ratio	N	S.D.	Mean	t-ratio
International	1	57-58	IS	23	7.76	78.83	0.86				
Politics			C	23	7.66	76.83					
	2	57-58	IS	18	8.22	60.94	0.88				
			C	19	8.48	62.84					
History	1	58-59	IS	11	27.31	176.52	0.84	10	30.54	152.73	0.77
			C	28	31.38	167.68		36	32.32	161.61	

APPENDIX IV-IV—TABLE 4A

Acquisition of Subject-Matter Knowledge as a Dual Function of Section Assignment and Level of Ability: GS Courses by Semester

				High Ability Subgroup (ACE–50% ile and Above)				Low Ability Subgroup (ACE–49% ile and Below)			
Course	Sem.	Year	Section	N	S.D.	Mean	t-ratio	N	S.D.	Mean	t-ratio
Introductory	1	56-57	GS	67	12.69	109.96	0.18	84	16.10	97.17	0.41
Business			C	70	9.07	109.50		68	13.72	96.68	
	2	56-57	GS	44	13.44	115.43	0.24	52	13.29	106.56	0.09
			C	58	15.63	115.66		46	13.65	106.87	
	1	57-58	GS	256	10.12	71.38	0.36				
			C	18	11.71	70.33					
	2	57-58	GS	179	12.97	104.49	1.03				
			C	13	12.60	108.38					
	1	58-59	GS	193	12.16	115.81	0.00	151	13.21	105.80	0.73
			C	26	12.30	115.80		19	15.06	108.52	
	2	58-59	GS	163	14.41	116.33	0.03	109	12.95	109.07	0.99
			C	28	10.20	115.71		20	9.68	111.60	
Composition	1	58-59	GS	52	3.68	36.12	2.96*	44	6.08	28.51	0.52
& Literature			C	27	6.54	32.04		19	4.92	27.92	

*$p < .01$

APPENDIX IV-IV—TABLE 4B

Acquisition of Subject-Matter Knowledge as a Dual Function of Section Assignment and Level of Ability: GS Course Across Years

			High Ability Subgroup (ACE–75% ile and Above)				Low Ability Subgroup (ACE–25% ile and Below)			
Course	Sem.	Section	N	S.D.	Mean	t-ratio	N	S.D.	Mean	t-ratio
Introductory	Fall	GS	154	5.96	56.02	0.47	128	10.80	43.66	0.92
Business		C	31	7.37	55.38		34	8.78	45.11	
	Spring	GS	121	12.04	53.21	0.37	69	12.72	43.94	0.54
		C	25	9.86	54.16		22	9.67	45.55	

APPENDIX IV-V

Performance on Tests of Problem Solving and Synthesis as a Dual Function of Section Assignment and Level of Ability[1] 1956-1957

Course	*Test*	*Section*	*High Ability Subgroup*				*Low Ability Subgroup*			
			N	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
Economics	Essay - First Semester	TV	78	10.63	34.67	2.47*	63	10.65	28.33	1.61
		Control	32	8.02	39.31		16	11.77	33.69	
Economics	Essay - Second Semester	TV	58	9.18	33.62	2.22*	54	8.97	29.91	0.52
		Control	21	6.48	37.81		20	8.97	31.15	
Economics	Essay - Second Semester	LC	53	9.99	34.30	1.54	......	......	......[2]	
		Control	15	7.14	30.67		......	......	......	
Economics	Essay - First Semester	LC	85	10.81	34.65	0.71	72	9.33	34.04	1.50
		Control	33	6.61	35.79		31	9.31	31.00	
Zoology	Reasoning - Bio. Sciences	LC	33	4.63	32.15	0.35	18	5.25	23.89	1.28
		Control	28	5.66	31.68		14	4.37	26.14	
Business & Government	Cases for Solution	LC	76	50.94	102.33	0.95	72	47.52	94.28	0.94
		Control	27	52.01	113.48		27	54.36	83.96	
Marketing	Cases for Solution	LC	68	7.34	75.24	0.52	36	7.01	73.61	1.24
		Control	53	6.79	74.57		22	7.20	76.05	
Sociology	Crit. Thkg. - Soc. Sciences	LC	40	5.80	33.25	1.16	......	......	......[2]	
		Control	21	5.81	35.10		......	......	......	
Psychology	Reasoning - Nat. Sciences	LC	40	6.05	33.38	0.30	......	......	......[2]	
		Control	24	4.53	33.79		......	......	......	
Composition & Literature	Effectiveness of Expression	LC	66	6.80	64.68	0.93	......	......	......[2]	
		Control	42	6.91	63.40		......	......	......	
	Theme - First Semester	LC	52	8.96	74.58	0.39	28	8.13	67.46	0.62
		Control	29	9.94	73.69		14	6.89	66.07	
	Theme-Second Semester	LC	51	8.46	71.25	1.24	......	......	......[2]	
		Control	30	8.42	73.70		......	......	......	

[1] Level of Ability defined by total score on ACE. Dichotomization occurred at the 50th percentile.

[2] Groups were too small to permit comparisons.

*$p < .05$

APPENDIX IV-VI—TABLE 1

The Samples for the Retention Study

Course	*Section*	*Students Enrolled in 1956-1957* *N tested*	*N used*	*Students Enrolled in 1957-1958* *N tested*	*N used*	*Total N's Used*
Zoology	TV			52	52	52
	Control			30	30	30
Air Science	TV	17	17	39	22	39
	Control	13	7	9	9	16
Educational Psychology	TV	36	35	59	43	78
	Control	15	13	17	16	29
Introd. Psychology	LC	20	17	29	19	36
	Control	18	8	11	9	17
Freshman English	LC	24	17	100	36	53
	Control	20	11	33	23	34
Social Studies	LC	10	8	29	28	36
	Control	10	8	29	28	36
Geography	LC	60	49	52	46	95
	Control	23	15	14	14	29
Introd. Business	GS	23	22	83	41	63
	Control	34	6	11	11	17
Geology	GS	27	27	51	38	65
	Control	12	8	12	12	20

APPENDIX IV-VI—TABLE 2

Summary of ACE and Retention Test Scores

Course	*Section*	*N*	*ACE* *Mean*	*S.D*	*Retention Test* *Mean*	*S.D*	*F-ratio§*
Zoology	TV	52	113.77	18.33	26.73	6.39	0.21
	Control	30	119.63	17.51	27.23	5.94	
Air Science	TV	39	112.26	17.23	46.62	7.63	0.36
	Control	16	111.69	21.82	47.44	6.02	
Educational Psychology	TV	78	111.19	18.97	31.19	4.53	1.11
	Control	29	107.79	15.96	31.69	5.12	
Introd. Psychology	LC	36	117.36	16.75	29.39	7.73	1.06
	Control	17	122.41	16.72	29.82	8.04	
Freshman English	LC	53	179.87Δ	18.67	31.94	6.45	0.34Δ
	Control	34	178.81Δ	23.02	32.32	4.90	
Social Studies	LC	36	112.06	17.08	21.92	5.65	0.89
	Control	36	105.06	22.16	21.69	5.94	
Geography	LC	95	110.62	18.13	25.96	4.60	0.55
	Control	29	115.03	17.72	27.52	6.28	
Introd. Business	GS	63	112.12	18.96	24.71	4.67	0.40
	Control	17	109.41	20.17	25.47	4.23	
Geology	GS	65	113.86	19.15	23.03	5.25	0.20
	Control	20	113.10	12.90	24.45	4.83	

§Analysis of covariance controlling on ACE. The number of degrees of freedom for each F-ratio is 1: Total N-3.

ΔTotal score on the Cooperative Test of English Achievement was used as the matching variable instead of ACE.

APPENDIX V-I—TABLE 1

Comparative Scores on the C-Scale of Students in the Experimental and Control Sections of Each Course

			Experimental Section		*Control Section*		
Course	*Type*	*Year*	*S.D.*	*Mean*	*S.D.*	*Mean*	*t-ratio*
A(1)	TV	55-56	0.88	3.43	0.85	3.28	0.94
	TV	56-57	0.60	2.87	1.00	3.20	2.36*
A(2)	TV	57-58	1.10	3.80	0.98	4.10	1.67
	TV	58-59	1.14	3.54	1.24	3.44	0.11
B	TV	55-56	1.24	4.50	0.91	4.00	2.27*
	TV	56-57	1.03	4.18	0.93	3.37	4.05**
C	TV	55-56	1.26	4.39	1.26	4.23	0.94
D	TV	56-57	1.12	3.74	1.00	3.52	0.92
	TV	57-58	1.17	3.76	0.96	3.12	2.46*
E	TV	56-57	1.20	4.05	1.18	3.91	0.47
F	TV	57-58	1.14	4.04	1.07	3.78	1.53
G	TV	58-59	1.11	3.66	0.89	3.10	0.84
a	LC	55-56	1.07	3.91	0.86	3.21	3.18**
	LC	56-57	0.96	3.58	0.78	3.32	1.53
	LC	57-58	1.11	3.52	1.08	3.31	0.88
b	LC	55-56	0.95	3.93	0.95	3.50	1.90
	LC	56-57	1.17	4.40	0.95	3.88	1.73
c	LC	55-56	1.07	3.83	0.89	3.37	2.88**
	LC	56-57	0.96	3.59	0.85	3.45	1.07
	LC	57-58	0.48	3.88	0.71	3.61	1.59
d	LC	55-56	1.10	3.97	0.83	3.68	1.26
	LC	56-57	1.16	4.62	1.32	4.54	0.27
	LC	57-58	1.05	4.11	1.26	4.02	0.23
	LC	58-59	1.17	4.34	1.62	4.45	0.23
e	LC	58-59	1.35	4.15	1.50	4.01	0.47
f	LC	56-57	0.82	3.43	0.96	3.40	0.01
g	LC	56-57	1.17	4.98	1.41	4.37	2.10*
	LC	57-58	1.12	4.74	1.11	4.30	1.47
h	LC	56-57	0.95	3.41	0.91	3.17	1.50
i	LC	56-57	0.85	3.61	0.69	3.43	0.64
j	LC	57-58	1.12	4.49	0.98	4.21	1.00
k	LC	56-57	0.67	2.88	0.48	3.03	0.79
l	LC	56-57	0.85	3.92	0.97	3.79	0.76
m	LC	56-57	1.03	4.19	0.99	4.10	0.42
n	LC	56-57	1.08	3.87	1.05	4.11	0.96
	LC	57-58	1.09	3.77	0.82	3.28	2.88**
	LC	58-59	1.18	3.43	0.89	3.21	0.96
o	LC	56-57	1.12	4.15	0.99	3.68	2.77**
p	LC	56-57	1.00	3.74	1.34	4.36	2.21*
q	LC	56-57	1.23	4.39	1.18	5.67	3.93**
r	LC	56-57	1.33	4.75	1.28	4.48	0.71
	LC	57-58	1.14	4.85	0.98	4.17	2.62*
	LC	58-59	1.00	5.00	1.42	4.48	1.30
s	LC	56-57	1.17	4.18	1.01	4.02	0.61
t	LC	57-58	1.04	3.56	1.07	3.80	0.92
Aa	GS	56-57	0.90	3.58	0.88	3.38	1.05
	GS	57-58	0.97	3.54	0.90	3.68	0.74
Bb	GS	56-57	0.96	3.70	0.72	3.18	5.20**
	GS	57-58	1.13	3.71	0.65	3.11	4.29**
Cc	GS	58-59	1.16	3.33	1.62	4.45	2.43*
aa	IS	57-58	0.45	2.98	0.57	2.75	1.64
bb	IS	58-59	1.00	3.72	1.05	4.00	1.00

* $p < .05$

** $p < .01$

APPENDIX V-I—TABLE 2

Attitude Toward Course Content as a Dual Function of Section Assignment and Academic Ability (1957-1958)

		High Ability Subgroup (ACE = 50% ile & Above)				*Low Ability Subgroup (ACE = 49% ile & Below)*			
Course	*Section*	*N*	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
A	TV	92	1.16	3.86	.62	80	.86	3.69	2.15*
	C	17	1.02	4.04		16	.92	4.12	
D	TV	53	1.24	3.84	2.62*				
	C	12	.97	2.95					
F	TV	78	1.03	4.00	.57	39	1.35	4.11	2.28*
	C	45	1.13	3.88		13	.67	3.45	
a	LC	65	1.10	3.45	.26				
	C	16	1.24	3.37					
c	LC	33	1.01	3.72	.67				
	C	13	.84	3.52					
d	LC	103	1.22	3.99	.00	40	1.25	4.24	.38
	C	62	1.23	3.99		19	1.28	4.08	
g	LC	93	1.17	4.67	.57				
	C	13	1.14	4.47					
j	LC	32	1.10	4.52	.81				
	C	20	1.07	4.27					
n	LC	28	1.27	3.92	2.70*	29	.94	3.69	1.04
	C	32	.67	3.19		32	.96	3.43	
t	LC	35	.98	3.40	.97				
	C	14	1.07	3.73					
Aa	GS	243	1.02	3.60	.86	204	.88	3.47	.06
	C	17	.78	3.78		10	1.08	3.49	
Bb	GS	110	1.10	3.69	3.75**	75	1.19	3.72	1.88
	C	20	.54	3.09		15	.83	3.23	

* $p < .05$

**$p < .01$

APPENDIX V-I—TABLE 3

Responses to "Motivational" Items from the C-Scale

Course	*Type*	*Year*	*Item 1: "Outside Reading"*		*Item 2: "Excuse to miss class"*		*Item 3: "Will avoid furthur contact"*		*Item 4: "Did not whet interest"*		*Item 5: "Considering vocation"*		*N*	
			%E	*%C*	*%E*	*%C*	*%E*	*%C*	*%E*	*%C*	*%E*	*%C*	*E*	*C*
A_1	TV	56-57	30	27	04	11	05	08	10	14	37	11	167	37
A_2		57-58	08	03	08	14	10	09	22	49••	14	06	162	35
		58-59	21	22	10	13	06	09	20	20	15	20	187	46
B	TV	56-57	08	17	16	05•	22	12	30	17	10	27•	169	41
D	TV	56-57	27	38	07	00••	10	09	25	28	46	53	139	32
		57-58	31	55•	07	10	13	05	29	20	54	60	112	20
E	TV	56-57	09	19	13	07	23	19	19	28	12	14	135	58
F	TV	57-58	13	10	09	09	32	24	33	26	10	10	135	68
G	TV	58-59	41	56	51	08••	12	04	22	12	24	29	58	48
a	LC	56-57	07	15	10	11	10	04	26	13	21	19	86	48
		57-58	18	23	14	10	13	07	24	17	20	20	113	30
b	LC	56-57	08	14	18	21	14	14	46	35	04	00	77	29
c	LC	56-57	13	14	02	05	09	00••	17	10	07	19	103	21
		57-58	11	13	20	03••	19	10	34	17	11	07	74	30
d	LC	58-59	13	18	18	22	43	44	48	47	03	04	89	45
f	LC	56-57	20	13	11	03•	09	13	20	17	15	11	127	64
g	LC	56-57	04	13	40	25	41	25	58	46	10	04	135	24
i	LC	56-57	38	23	13	13	13	04	11	13	21	19	21	27
j	LC	57-58	05	10	20	24	13	21	49	31	08	03	39	29
l	LC	56-57	06	02	04	14	23	18	30	37	17	13	47	54
n	LC	56-57	24	35	03	13•	13	26	31	33	03	02	70	54
		57-58	20	50••	08	09	22	16	22	19	03	06	73	64
		58-59	44	46	25	02•	14	11	24	16	12	14	88	63
o	LC	56-57	07	10	19	07•	36	23	33	27	06	17•	122	60
r	LC	58-59	00	09	37	09•	24	14	44	27	10	14	41	22
s	LC	56-57	07	21	22	21	26	21	34	46	14	25	85	28
t	LC	57-58	38	22	12	13	10	13	21	22	17	22	58	23
Aa	GS	57-58	14	04•	07	04	04	04	20	22	45	22••	454	27
Bb	GS	57-58	15	08•	09	03	23	08••	22	03••	15	26	180	39
Cc	GS	58-59	44	18••	09	22•	15	20	27	47•	13	04	106	45
bb	IS	58-59	52	35	†	20	26	26	48	37	11	06	27	49

† does not apply

• $p < .05$

•• $p < .01$

APPENDIX V-II—TABLE 1

Summary of I Scale Ratings

Course	*Type*	*Year*	*Experimental Section*		*Control Section*		*t-ratio*
			S.D.	*Mean*	*S.D.*	*Mean*	
A_1	TV	55-56	1.02	2.94	1.00	3.14	0.11
A_1	TV	56-57	0.94	2.28	0.99	2.28	0.00
A_2	TV	57-58	1.13	4.02	0.95	3.92	0.55
A_2	TV	58-59	1.24	3.61	1.02	3.42	0.25
B	TV	55-56	1.74	4.56	1.40	4.10	1.35
B	TV	56-57	1.17	4.56	1.19	3.44	4.67**
D	TV	56-57	1.23	3.90	0.97	3.48	1.62
D	TV	57-58	1.24	3.99	1.09	3.38	2.10*
E	TV	56-57	1.25	3.84	1.03	3.10	3.52**
F	TV	57-58	1.06	3.47	0.91	3.00	3.36**
G	TV	58-59	1.09	3.66	1.09	2.71	1.13
a	LC	55-56	1.16	4.64	1.48	4.00	2.14*
a	LC	56-57	1.13	4.27	1.10	3.66	2.90**
a	LC	57-58	1.27	4.34	1.37	3.81	1.47
b	LC	55-56	0.80	3.60	0.40	3.62	0.00
b	LC	56-57	1.26	3.97	1.16	3.44	1.77
c	LC	55-56	1.06	3.58	1.16	3.10	2.67**
c	LC	56-57	1.02	2.82	1.14	2.71	0.79
c	LC	57-58	1.05	3.08	1.11	3.01	0.25
d	LC	55-56	1.08	3.42	0.98	3.22	0.77
d	LC	56-57	1.58	4.22	1.65	4.30	0.19
d	LC	57-58	1.14	3.89	1.08	3.98	0.61
d	LC	58-59	1.31	4.13	1.11	4.20	0.11
e	LC	58-59	1.60	4.25	1.50	4.00	0.76
f	LC	56-57	0.74	1.90	0.71	1.94	0.06
g	LC	56-57	1.57	4.03	1.25	3.11	2.49*
g	LC	57-58	1.20	3.54	0.69	3.44	0.45
h	LC	56-57	1.09	2.46	0.73	2.30	0.36
i	LC	56-57	1.33	3.20	0.79	2.72	1.30
j	LC	57-58	1.11	3.82	0.89	3.81	0.04
k	LC	56-57	1.10	2.65	1.05	2.66	0.00
l	LC	56-57	1.30	3.28	1.09	3.43	0.81
m	LC	56-57	0.94	4.50	1.18	4.46	0.17
n	LC	56-57	1.16	3.74	0.95	3.20	1.96*
n	LC	57-58	1.09	3.17	1.06	2.90	1.35
n	LC	58-59	1.07	2.91	0.88	2.45	2.09*
o	LC	56-57	1.19	3.73	1.21	3.50	1.15
p	LC	56-57	1.13	3.41	1.29	4.29	3.09**
q	LC	56-57	1.17	4.53	1.22	4.96	1.31
r	LC	56-57	0.86	4.30	1.36	3.98	1.08
r	LC	57-58	1.01	4.21	0.91	3.67	2.08*
r	LC	58-59	1.12	4.02	1.04	3.95	0.21
s	LC	56-57	1.21	4.34	1.22	4.29	0.14
t	LC	57-58	1.03	3.28	1.17	3.89	2.18*

continued

APPENDIX V-II—TABLE 1 continued

Summary of I Scale Ratings

Course	*Type*	*Year*	*Experimental Section*		*Control Section*		*t-ratio*
			S.D.	*Mean*	*S.D.*	*Mean*	
Aa	GS	56-57	0.95	3.64	1.11	3.03	4.69**
Aa	GS	57-58	1.17	3.54	1.13	3.06	2.09*
Bb	GS	56-57	1.01	3.30	0.92	2.84	2.00*
Bb	GS	57-58	1.40	3.70	0.90	2.42	7.11**
Cc	GS	58-59	0.98	3.14	1.11	4.20	1.83
aa	IS	57-58	0.88	2.60	0.72	2.37	1.04
bb	IS	58-59	1.24	3.53	0.96	4.20	2.09*

* $p < .05$
** $p < .01$

APPENDIX V-II—TABLE 2

Attitude Toward Instructor as a Dual Function of Section Assignment and Level of Ability (1957-1958)

Course	*Section*	*High Ability Subgroup (ACE = 50% ile & above)*				*Low Ability Subgroup (ACE = 49% ile & below)*			
		N	*S.D.*	*Mean*	*t-ratio*	*N*	*S.D.*	*Mean*	*t-ratio*
A	TV	91	1.19	4.08	.96	73	1.04	3.94	.41
	C	16	.77	3.86		16	1.02	4.06	
D	TV	52	1.19	3.97	2.86**				
	C	12	.80	3.10					
F	TV	76	1.00	3.48	2.72**	37	1.17	3.45	1.33
	LC	44	.94	2.99		13	.76	3.05	
a	LC	61	1.26	4.35	1.08				
	C	16	1.39	3.93					
c	LC	33	1.07	2.92	.08				
	C	13	1.09	2.95					
d	LC	102	1.31	3.85	.87	40	1.46	4.08	1.12
	C	62	1.48	4.05		19	1.45	3.62	
g	LC	90	1.13	3.44	.27				
	C	13	.92	3.52					
j	LC	32	1.15	3.85	.50				
	C	20	.70	3.98					
n	LC	28	1.11	3.58	3.25**	29	1.03	2.93	.46
	C	32	1.01	2.67		32	1.03	3.05	
t	LC	34	1.00	3.07	2.65*				
	C	15	1.09	3.97					
Aa	GS	239	1.20	3.60	.96	198	1.15	3.45	1.43
	C	17	1.06	3.33		10	1.30	2.82	
Bb	GS	109	1.39	3.74	5.83**	73	1.39	3.63	3.21**
	C	21	.80	2.40		15	1.12	2.54	

* $p < .05$
** $p < .01$

APPENDIX V-II—TABLE 3

Responses to Some Specific Items in the I-Scale

Course	Year	Type	*Percent of Favorable Ratings to:*																	
			Item 6:		*Item 7:*		*Item 8:*		*Item 9:*		*Item 14:*		*Item 15:*		*Item 16:*		*Item 19:*		*Item 24:*	
			E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C
A_1	56-57	TV	94	86	89	87	95	100*	91	92	75	87	75	92**	92	95	77	71	69	79
A_2	57-58	TV	45	34	57	66	75	69	56	48	72	74	57	46	53	48	24	14	36	26
	58-59		11	00*	70	69	33	30	22	15	82	82	06	09	67	80**	10	30	75	72
B	56-57	TV	27	31	52	77**	94	98	31	50*	44	74**	35	65**	38	86**	27	55**	34	27**
D	56-57	TV	74	66	79	84	65	74	61	69	47	72**	57	66	52	66	51	62	37	52
	57-58		52	55	65	65	52	70	53	60	52	50	60	50	59	80*	52	55	44	55
E	56-57	TV	74	91**	77	88*	61	88**	66	74	50	97**	46	83**	39	72**	26	45*	22	50**
F	57-58	TV	83	97**	73	94**	91	99*	78	93**	37	55*	47	73**	70	94**	47	61	33	54**
G	58-59	TV	45	42	67	85	40	25	31	15	86	98*	12	04	64	83*	14	40**	69	81
a	56-57	LC	25	40	34	49	58	51	26	38	22	30	35	54*	46	52	34	24	31	35
	57-58		21	30	29	40	44	67*	26	37	25	53**	41	44	31	53	28	37	34	44
b	56-57	LC	99	97	99	97	100	96	96	97	96	97	97	97	97	98	74	72	75	81
c	56-57	LC	99	100	96	95	98	95	93	91	52	51	74	91	86	95	55	76*	61	76
	57-58		83	83	87	93	84	79	73	72	82	73	63	55	68	69	41	45	35	59*
d	57-58	LC	36	50	47	49	55	58	42	50	36	45	42	51	35	40	20	27	48	48
	58-59		27	20	56	42*	54	51	36	38	55	49	43	44	58	33**	15	13	54	49
f	56-57	LC	73	72	61	72	84	96*	47	65	28	38	28	38	35	51	25	28	24	27
g	56-57	LC	68	83	63	86**	73	79	68	79	32	73**	35	55*	34	48	17	34	21	52**
	57-58		82	94	74	83	73	50	78	89	52	73	58	78	49	44	21	33	35	67
n	56-57	LC	52	51	63	56	85	100**	46	52	62	56	51	63	63	48	40	48	63	70
	57-58		56	78**	65	83*	93	54**	54	67	65	77	51	75**	70	79	52	68	64	78
	58-59		56	57	78	93*	36	22	28	09**	82	82	14	11	64	79*	33	35	69	76
Aa	56-57	GS	35	57**	58	79**	68	82**	47	65**	71	81**	54	75	63	76*	36	48*	42	69**
	57-58		43	66*	74	85**	68	79	52	56	66	96**	60	57	67	86**	37	26	51	59
Bb	56-57	GS	84	87	83	78	63	87**	77	83	71	81	71	76	74	84	48	62	54	64
	57-58		64	98**	74	87	61	92**	63	77	69	92**	65	77	63	93**	38	71**	50	82**
Cc	58-59	GS	23	20	66	42	32	51	20	38	78	49**	23	44**	57	33**	31	13*	76	49**
aa	57-58	IS	57	89**	75	91	89	97	71	90	50	78*	†		82	96	89	93	86	93

†item doesn't apply

* $p < .05$

** $p < .01$

APPENDIX VII-I

PURPOSES AND FUNCTIONS: THE AUDIO-VISUAL SERVICE, MIAMI UNVERSITY

The chief purpose of the Miami University Audio-Visual Service is that of assisting in the teaching process through making available needed instructional materials and services, particularly audio and visual aids to instruction. The accomplishment of this purpose will require, (1) graphic production, (2) audio production, (3) printing, (4) three dimensional production, (5) projection, (6) procurement of materials through loan, rental and purchase, and (7) the development of an instructional materials library. Included also, are (8) the selection and purchase of audio-visual equipment, (9) the storage and maintenance of equipment, (10) inventorying of audio-visual equipment, (11) training staff members in the use of equipment, and (12) assisting staff members in the identification and solution of problems in the communication process.

I. Basic areas of service

A. Production of Instructional Materials

1. Transparent materials, including slides, film strips and overhead projection transparencies

2. Graphic materials, including charts, graphs, and photographs

3. Three-dimensional materials including models and mock-ups

4. Printed materials including workbooks, brochures, etc., for instructional purposes

5. Audio-tape materials for instructional use

6. Motion pictures within the limits of available funds

B. Projection and play-back

1. Furnish equipment and operator for classroom projection service

2. Furnish audio play-back equipment and assistance in use when necessary

C. Develop and maintain an instructional materials library

1. Purchase films, film-strips, and recordings upon advice of using departments

2. Catalog, store and maintain instructional materials

3. Perform rental services for instructional departments in the procurement of instructional materials

4. Furnish information on instructional materials in the audio-visual library and those available through other sources

D. Make available consultative services to individual instructors and to departments in the selection, production, and use of instructional materials and in the use of equipment

E. Provide technical consultative service to the administration and architects in long-range building and facility planning, and in the remodeling of present rooms to facilitate the use of instructional equipment

II. Discretionary areas of service

The Audio-Visual Service is uniquely equipped and staffed to perform production and projection services for various administrative and public relations agencies of the University as well as for student organizations. Consequently, there is a continuous and increasing demand upon the Audio-Visual Service for the production of brochures, guide books, charts, graphs, posters, audio recordings, photographs, motion pictures and other materials and services not primarily for instructional purposes. This demand, if not carefully regulated, can easily grow to such proportions that it will seriously interfere with the performance of the basic purpose of the Audio-Visual Service, namely, that of assisting the teaching staff in the instructional process. Consequently, it is necessary to restrict extra-instructional productions and services to those directly related to the administrative and public relations activities of the University, and to establish controls so that these demands do not operate to prevent the satisfactory performance of the basic function of the Service. To this end the following policies are established:

A. Requests for services and materials other than for instructional purposes will be honored only if this can be done without a curtailment of instructional services and without causing an undue delay in rendering these services.

B. Decision in regard to the performance or non-performance of non-instructional services shall be made by the Director of Audio-Visual Service. In cases of doubt or of protest he may refer the matter to the Chairman of the University Audio-Visual Committee for decision.

III. Operational policies

It is considered desirable to keep operational procedures as simple and as free from "red tape" as possible so that instructors and departments will be encouraged to make full use of audio-visual services of the University. The following general rules and policies will govern requests for *instructional* services:

A. In case there is to be no charge against the department concerned, requests for instructional materials and services will be accepted directly from an instructor.

B. Orders and requests normally will be accepted by phone or by direct personal contact, although signed requisitions will be requested when needed for record or for accounting purposes.

C. In situations in which charges are to be made against a department or division of the University, an order signed by the departmental chairman or divisional head will be required.

D. Whenever instructional requests *cannot* be satisfied within the period of time requested, the Director of the Audio-Visual Service will determine priorities of fulfillment. Individuals, departments and divisions will be notified if delay is necessary in complying with their requests.

E. Audio-visual equipment may be placed in a department on an "extended loan" basis when this will result in economy of equipment and personnel and contribute to instructional effectiveness.

IV. Budgetary procedures and cost accounting

A. Funds available for film rentals, production of graphics, including slides and overhead transparencies, inexpensive models and mock-ups, recordings and similar materials desired by individual professors for instructional purposes shall be allocated directly to the Audio-Visual Service rather than to separate departments. Materials and services made available by this money shall be furnished faculty members free of charge within limitations of the budget. This principle should also apply to monies intended for the development of an instructional materials (audio-visual) library and for audio-visual equipment.

B. Audio-visual equipment normally should be purchased and maintained by the Audio-Visual Service rather than by separate departments in order to insure care and discrimination in its purchase. Funds for such purchase should be allocated to the Audio-Visual Service. This policy should not be applied to budgeting money for specialized laboratories such as the Romance Language Laboratory or the School of Education Audio-Visual Laboratory, nor should it be applied to the Athletic Department or to the McGuffey School.

C. Workbooks and similar instructional materials for distribution to individual students normally will be charged against departmental Rotary F accounts.

D. Motion picture production, sets of specialized slides, and other services and materials for which the unit cost is comparatively high, normally should be borne by the department or division making the request.

E. The annual budget of the Audio-Visual Service will be prepared by the Director, and submitted to the Audio-Visual Committee for advice and concurrence before being submitted to the approving administrative officer of the University. Requested budgetary allocation shall follow a pattern to be developed by the Audio-Visual Committee under recommendations of the Director of the Service.

F. A schedule of charges shall be prepared by the Director and approved by the Audio-Visual Committee to govern those costs that are to be assessed to departments and divisions of the University for services and materials. This will cover both instructional and non-instructional materials and services.

G. Charges normally will be made for non-instructional services listed under "Discretionary Areas of Services" in accordance with the schedule of charges developed under IV, F above.

V. Statistical controls and reports

Statistical controls and reports have a significant place in the operation of an Audio-Visual Service. They can be justified, however, only if they operate to increase the effectiveness of the Service, and are needed for planning purposes. Such accounting and reporting of services rendered, materials used, and job breakdowns should be held to a minimum consistent with the above purpose. A system of accounting and a schedule of reporting will be mutually agreed upon by the Director of the Service and the Audio-Visual Committee.

VI. Personnel policies

A. University employment policies and practices for administrative, unclassified and classified personnel shall be followed within the Audio-Visual Service.

B. It is recognized that because of the special qualifications of certain of the members of the Audio-Visual Service there will be requests from individuals, departments and student organizations for services to be performed outside of regular working hours. These services often involve the use of University facilities and equipment. *The Addendum to Information Bulletin for Faculty and Staff—1958,* is of direct application to this problem. It is as follows:

Subject: Private enterprise involving facilities of the University

> The University cannot permit the use of state-owned equipment or facilities for any kind of non-credit private instruction or other type of private enterprise. This regulation does not cover activities which are an integral part of the regular teaching load or other official assignment of members of the staff.

C. Scientific discoveries and technological developments have revolutionized the facilities of communication in recent years, with its resultant impact on audio-visual equipment and services. This change will continue at an accelerated pace, necessitating increasing effort on the part of audio-visual personnel to keep abreast of advancing technology. Personnel, consequently, should be encouraged to attend workshops and conferences and to hold membership in professional societies and associations in order that the audio-visual services may continue to improve.

Adopted by the Audio-Visual Committee of the University

February 5, 1959

A. J. Alton **C. N. Bogner** **J. E. Dome**

L. H. Houtchens **J. R. Neill** **F. G. Macomber, Chairman**

OBSERVATIONS AND RECOMMENDATIONS REGARDING THE AUDIO-VISUAL PROGRAM AT MIAMI UNIVERSITY

Higher education in today's world is faced with a multiplex of crucial problems: the anticipated enrollments in colleges and universities; the exploding demand for classrooms, laboratories, and library facilities; the decreasing ability to procure competent and qualified faculty members; and the public concern over increased financial support of higher education. These problems have shaken the colleges and universities out of their traditional role and have placed them on exhibit for public scrutiny. National and international crises have increased the demand for highly trained as well as broadly prepared citizens, who can cope with every phase of human endeavor.

To meet these challenges, colleges and universities (and particularly Miami University) are seeking ways by which instructional standards can be maintained and improved while efficient use of faculty resources is accomplished.

Miami University has long enjoyed the reputation of being an institution of academic greatness. It is continuing and enhancing this reputation by experimenting boldly to discover new dimensions in the teaching and learning process. Continuous evaluation and research at Miami University has sharpened and redoubled its efforts to achieve superior means of communication between the teacher and the learner.

It was in this tradition of re-evaluating and re-searching that the University requested the services of consultants to assist the faculty and staff in an appraisal of the audio-visual program as it relates to the improvement of instruction.

This report includes general observations, specific observations, and recommendations. The separate items under each category are described by four major headings:

I. Support of the Program
II. Activities of Audio-Visual Service
III. Relationship Between Audio-Visual Service and Other Agencies of the University
IV. The Use of Audio-Visual Materials in Instruction

GENERAL OBSERVATIONS

I. Support of the Program:

A. There is a deep concern and interest in the effective utilization of audio-visual materials for the improvement of instruction by the administrative officers, deans, and department chairmen.

B. The new organizational structure under the Dean of Educational Services has brought together the component parts of allied agencies in developing a unique educational communications operation.

C. The Audio-Visual Committee is performing an outstanding job in outlining the purposes and functions of the audio-visual program in the university.

II. Activities of Audio-Visual Service:

A. The Audio-Visual Service is a well-organized, efficiently-operated, service-oriented activity which is meeting the instructional materials needs of the Miami University faculty.

B. The abilities of each member of the Audio-Visual Service staff are complementary and insure a wide range of knowledge which can be applied to problems of instructional communication. In addition, the *espirit de corps* of this staff is extremely high and to that end a "team" approach is evident.

III. Relationship Between Audio-Visual Service and Other Agencies of the University:

A. The teaching of audio-visual courses and the laboratory work in audio-visual instruction by the School of Education is in harmony with the activities of Audio-Visual Service.

B. The relationship between the broadcast activities, especially television and Audio-Visual Service, is most satisfactory and agrees with the separate functions of each agency.

IV. The Use of Audio-Visual Materials in Instruction:

A. A greater acceptance of the use of audio-visual materials in instruction has been tremendously stimulated by the program of Experimental Studies in Instructional Procedures.

B. A wide variety of audio-visual media are being utilized with no one medium predominating. The emphasis is on the communication of ideas by using the most effective medium.

C. Individual faculty members seem interested in exploring improved teaching techniques and effective utilization of audio-visual materials in the classroom.

SPECIFIC OBSERVATIONS

I. Support of the Program:

A. Audio-Visual Service has had to depend on the income of fringe activities to insure adequate funds to meet the instructional demands.

II. Activities of Audio-Visual Service:

A. Commercially produced materials at the college level are limited; however, Audio-Visual Service has the necessary personnel facilities and equipment to produce almost any type of custom-made materials for college instruction.

B. The provision of consultative services for individual faculty members offers a unique and needed adjunct to the instructional program.

C. There is an increasing consultation service being performed in the planning of new buildings, but there is a lack of communication between Audio-Visual Service and some departments concerning consultation services which are available such as: the development of new facilities; expanding current facilities; and maintenance, repair, and purchase of equipment. There is no established policy regarding the purchase, replacement and distribution of equipment.

D. There is a lack of consistency in keeping the faculty constantly informed about new materials and equipment.

E. Audio-Visual Service is primarily a production and service unit which performs necessary technical activities without an active concern for basic teaching problems and effective utilization techniques.

F. There is presently no organizational pattern for the cataloging, storage and distribution of materials produced at Miami University for outside use. This reference is specifically aimed at the tape recorded programs to be used for cultural, educational and informational purposes on commercial radio stations. Similar situations might occur when television recordings become available.

III. Relationship Between Audio-Visual Service and Other Agencies of the University:

A. The language laboratory, music listening room, audio-visual laboratory and similar resource centers are contributing greatly to the cultural and professional growth of the students.

IV. The Use of Audio-Visual Materials in Instruction:

A. Many existing classrooms are inadequately equipped for the use of projected materials.

B. There is little systematic attempt to orient faculty members in the use of audio-visual materials and equipment and to stimulate new methods and techniques other than those gained through television experience.

C. Many faculty members interested in improving instruction have been hampered by the lack of released time or overload salary.

RECOMMENDATIONS

I. Support of the Program:

A. The Audio-Visual Committee should be continued with the proviso that future objectives of the committee are identified and clarified. A focal point of the function of the committee should be the improvement of instruction through the use of audio-visual media.

B. Faculty support, department by department, should be enhanced by the appointment of a faculty member to act in a liaison capacity with Audio-Visual Service. By this procedure information concerning new materials, equipment, and techniques can be channelled to the department. Conversly teaching problems of the department which relate to communication can be channelled to Audio-Visual Service.

C. As the audio-visual program grows and develops, consideration should be given to expanding the function of the Audio-Visual Committee to include the related activities under the direction of the Dean of Educational Services.

D. Since the administration of the university has recognized the value and importance of audio-visual materials in the instructional program, the Audio-Visual Service should receive direct and adequate financial support as soon as practicable. Such support will prevent further dependence upon the income from non-instructional activities such as photostating records of students and non-instructional printing.

II. Activities of Audio-Visual Service:

A. The obvious acceptance and benefit derived from current consultative services indicates a necessity for increased activity in this area. Response from the faculty indicates that although the service is available, greater effort should be made by the audio-visual staff to exert active leadership in assisting individual instructors with problems of communication in the classroom. Consideration should be given to the expansion of this service by increasing the consultative staff as soon as it is financially practical. This may be accomplished by relieving the professional staff of routine technical duties and/or by procuring additional professional assistance.

B. Long range plans should immediately be established to provide facilities in each classroom for projected materials. These should include electrical outlets, light control facilities, and permanent wall-type screens. Such planning will eliminate a major deterrent to the use of projected materials as stated by some faculty members.

C. Policies and procedures should be formulated to insure that the professional audio-visual staff serve in an advisory capacity in the planning of all new instructional facilities. (See the statement of "Purposes and Functions of Audio-Visual Service" formulated by the Audio-Visual Committee.)

D. The inventory of all audio-visual equipment used for instructional purposes should be maintained by Audio-Visual Service. All audio-visual equipment should be the direct responsibility of Audio-Visual Service, making possible the effective maintenance, distribution, and use of equipment. This means that all existing equipment on campus or in extension centers should be controlled from a centralized source. The decentralized distribution of equipment should continue, but equipment located in departments and extension centers should be considered as being on permanent loan. Audio-Visual Service should continue to provide stand-by equipment to meet additional demands or to replace equipment being repaired.

E. Schedules should be designed for systematic inspection and maintenance of all audio-visual equipment. This includes the language laboratory, the audio-visual laboratory, and equipment on permanent loan.

F. The purchase of all new audio-visual equipment should be cleared through Audio-Visual Service. A centralized system of purchasing equipment in quantity will reduce initial unit cost, prevent costly duplication, and provide for less expensive maintenance and replacement of standardized parts.

G. A plan should be devised for the amortization and replacement of all audio-visual equipment to insure optimum performance, lower replacements costs, and to prevent accumulation of obsolete equipment. (A similar policy is in effect for automotive equipment belonging to the University.)

H. It seems evident that there is a definite need for personalized guidance concerning various types of audio-visual materials and equipment and their effective utilization. Provisions should be made to conduct departmental seminars, demonstrations, and similar activities.

I. Procedures should be established for the cataloging, storing, and distributing of recorded materials for off-campus use. Consideration should be given to the establishment of a tape library which would consolidate existing collections of recorded material of historical and current interest.

III. Relationships Between Audio-Visual Service and Other Agencies of the University:

A. More active participation in the development and operation of specialized educational facilities such as the language laboratory and the music listening room should be fostered.

IV. The Use of Audio-Visual Materials in Instruction:

A. Consideration should be given to granting faculty members released time to work in conjunction with Audio-Visual Service in the selection and/or production of audio-visual materials for instructional purposes.

Recommendations Concerning the Statement of "Purposes and Functions, Audio-Visual Service, Miami University"

A specific request was made of the consultants to review the statement of "Purposes and Functions, Audio-Visual Service, Miami University" prepared and adopted by the Audio-Visual Committee on February 5, 1959. The following recommendations are made in light of the visitation and in harmony with the general recommendations above:

(1.) More emphasis should be placed upon furnishing assistance with utilization techniques and identification of problems in the communication process.

(2.) Include provisions for the selection, purchase, inventory and maintenance of all audio-visual equipment used for instructional purposes.

(3.) Include provisions for equipping current classrooms for the use of projected materials.

(4.) Include provisions for the amortization and replacement of equipment.

The consultants recommend the adoption of the statement of "Purposes and Functions, Audio-Visual Service, Miami University" after suggested changes have been reviewed.

In conclusion, the consultants wish to express their sincere appreciation to Glenn Macomber, John Dome, Laurence Siegel, and members of the Miami University family for their outstanding hospitality and courteous treatment during their stay in Oxford. It is sincerely hoped that this report will be of assistance in stimulating further development of the audio-visual program as it contributes to the total role of high quality instruction.

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